An analysis of the credit card program using process innovation

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AN ANALYSIS OF THE CREDIT CARD PROGRAM USING PROCESS INNOVATION

by

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Since the early 1990s, acquisition reform has been the focus of DoD acquisition and has affected nearly every process in the acquisition cycle. The implementation of the Federal Acquisition Streamlining Act has placed more emphasis on allowing contracting officers to apply sound business judgment instead of blindly following detailed regulations and procedures. This goes a long way toward improving and streamlining the contracting process.

One of the key reform initiatives in streamlining the process is the implementation of the Government-wide credit card program. The focus of this thesis is to look at the benefits the Marine Corps has observed since the implementation of the credit card, examine the savings and determine if the process has met its objective of making the acquisition cycle more efficient. The thesis also looks at current processes and develops three redesign alternatives that offer good potential to further streamline the process. The thesis also suggests mechanisms for implementing these process redesigns and generalizes as to how they can be applied to other DoD organizations.

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AN ANALYSIS OF THE CREDIT CARD PROGRAM USING PROCESS INNOVATION

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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

Since the early 1990s, acquisition reform has been the focus of DoD acquisition and has affected nearly every process in the acquisition cycle. The implementation of the Federal Acquisition Streamlining Act has placed more emphasis on allowing contracting officers to apply sound business judgment instead of blindly following detailed regulations and procedures. This goes a long way toward improving and streamlining the contracting process.

One of the key reform initiatives in streamlining the process is the implementation of the Government-wide credit card program. The focus of this thesis is to look at the benefits the Marine Corps has observed since the implementation of the credit card, examine the savings and determine if the process has met its objective of making the acquisition cycle more efficient. The thesis also looks at current processes and develops three redesign alternatives that offer good potential to further streamline the process. The thesis also suggests mechanisms for implementing these process redesigns and generalizes as to how they can be applied to other DoD organizations.

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A. PURPOSE

This thesis addresses problems and limitations in the current credit card program and explores methods of improvement using a process innovation approach. The main emphasis of this thesis is an analysis of the credit card program for process innovation and to further describe enablers and inhibitors of innovation in the DoD contracting process.

B. BACKGROUND

Since the early 1990s, acquisition reform has been the focus of DoD acquisition and has affected nearly every process in the acquisition cycle. The implementation of the Federal Acquisition Streamlining Act (FASA) has placed more emphasis on allowing contracting officers to apply sound business judgment instead of blindly following detailed regulations and procedures. This goes a long way toward improving and streamlining the contracting process.

One of the key reform initiatives in streamlining the process is the implementation of the Government-wide credit card program. The focus of this thesis is to look at the benefits the Marine Corps has observed since the implementation of the credit card, examine the savings and determine if the process has met its objective of making

the acquisition cycle more efficient. The thesis also looks at current processes and regulations to determine if innovations can be made to further streamline the process. Finally, where such innovations look promising, the thesis identifies how they can be applied to other DoD organizations.

C. RESEARCH QUESTIONS

1. Primary Research Question:

How can the Marine Corps purchase card process be innovated, and how can such innovations be applied to different Services and agencies?

2. Secondary Research Questions:

a. How did the acquisition process function prior to the purchase card program?

b. How does the acquisition process function with the purchase card program?

c. What pathologies or shortcomings still exist in the purchase card program?

d. What techniques can be employed to innovate the purchase card program?

e. How can purchase card process innovations be generalized to other Services and agencies?

D. METHODOLOGY

The methodology of this thesis is to use a deductive approach that focuses on Thomas Davenport's Process Innovation Framework to analyze the credit card program, suggest ways to improve the program and determine if any of those improvements can be applied to other Services and agencies.

Data are collected in two forms. The first is a literature review from the Dudley Knox Library and the World Wide Web. The literature review provides the researcher with background in current policies and practices, to gain a better understanding of the process innovation approach and determine the benefits and limitations of the current credit card program.

The second data collected mentioned focuses on interviews/surveys with key individuals in the credit card program at the DoD level, Headquarters Marine Corps, contracting officers at the user level as well as contractors who have benefited from the implementation of the credit card program. The interviews are conducted with influential persons in the credit card program and acquisition field. The focus of the interviews is to gather data from contracting officers on their personal views of the benefits and limitations of the credit card

program as it affects their areas and explore recommendations for improvements. Secondly, the interviews focus on the views of key individuals in the credit card program to determine the boundaries of the program and where those boundaries can be eliminated or relaxed.

E. SCOPE OF THESIS

The audience for this thesis includes DoD policy makers, program managers, and contracting officers. This thesis addresses problems and limitations in the current credit card program and explores methods of improvement using a process innovation approach. The main emphasis of this thesis is an analysis of the credit card program for process innovation and to further describe enablers and inhibitors of innovation in DoD the contracting process. This thesis is focused on investigating the credit card process associated with the Marine Corps, but it also attempts to generalize the results to other services.

F. ORGANIZATION

Following the thesis introduction in this chapter, Chapter II discusses the background of the credit card program, outlines the current credit card process and its limitations as well as the benefits the Marine Corps has seen since its implementation. Secondly, it summarizes Thomas Davenport's methodology for process innovation.

In Chapter III, data gathered from literary research and the World Wide Web are used to survey the background and credit card program policies and practices, and determine the benefits and limitations of the program. Secondly, the chapter presents data from interviews/surveys conducted with key individuals in the credit card program at the DoD level, Headquarters Marine Corps, contracting officers at the user level as well as contractors who have benefited from the implementation of the credit card program. The focus of the interviews is to gather data from contracting officers on their personal views of the benefits and limitations of the credit card program as it affects their area and explore recommendations for improvements. Additionally, the interviews attempt to surmise the boundaries of the program and identify those boundaries that can be lifted or expanded. Fourth, the data collected are consolidated in a comparative analysis using Thomas Davenport's model to identify possible enablers.

The fourth Chapter analyses the positive implications and inhibitors of the credit card program's process. The methods to overcome those inhibitors are then outlined. From the enabler's identified to streamline the credit card process, a redesign procedure is outlined. Conclusions are

then made describing the potential success or failure of the redesigned credit card process.

Chapter V summarizes the conclusions made, makes recommendations for future innovation of the credit card process and identifies areas for future research.

G. BENEFITS OF STUDY

The credit card program has produced great efficiency and cost savings since its implementation. Despite this initial success, it may be possible to innovate the process further and improve the efficiency and savings to DoD. But, it is not immediately clear how such innovation could be effected. This thesis explores this issue using a structured approach to process innovation and intends to answer this important question.

II. BACKGROUND

A. INTRODUCTION

The Commercial Credit Card Program was initiated as a procurement reform initiative under the President Reagan's Council on Management Improvement under Executive Order Number 12352. [Ref. 3] In 1986 Alan Balutis, Deputy Chief Information Officer for the Department of Commerce, took the lead in establishing a pilot program at the National Oceanic and Atmospheric Administration to determine the feasibility and effectiveness of a Government Wide Commercial Credit Card Program. The success of the pilot program lead to the establishment of a bank card center in Kansas City, MO. In 1988 Carolyn Alston, Deputy Assistant Commissioner of the Federal Supply Service, spearheaded GSA's effort to turn the Commerce Department's pilot program into one of the most successful innovations in Government. [Ref. 2]

The implementation of the Government Wide Commercial Credit Card has achieved significant success within the DoD. Prior to the implementation of the credit card, micropurchases for supplies and services were labor intensive and required many levels of approval. This inefficient process caused the customer to suffer from long waiting periods between the time of requisition and the

time of receipt. Due to the extensive layering of the requisitioning cycle and long waiting time between requisition and time of receipt, costs prior to the implementation of the Credit Card Program were estimated to exceed $155 per transaction. [Ref. 13]

The Credit Card Program has forced a system previously layered in checks and balances to become a more efficient process and has transferred the procurement responsibility to individual cardholders and approving officials. Since 1989, the Government Wide Commercial Credit Card has grown more than 75% annually. It is estimated that over 92% of all micropurchases will be completed with the purchase card this year totaling $3.4 billion. That estimate well exceeds the goal set by DoD to reach a usage level of 90% by the year 2000. [Ref. 15] Additionally, a study at the Department of Agriculture has concluded that the average transaction cost has dropped to $17 per transaction. [Ref. 2] Forecasts now predict that DoD will achieve a savings level of $29.5 million annually by 2000 from the implementation of the DoD Purchase Card Program. These savings combined with the ease of use, responsiveness to customer needs and timely payments to vendors have contributed substantially to the success of the Government Wide Commercial Credit Card Program for the DoD.

B. PRE-CREDIT CARD PROCEDURES

The following paragraphs and diagram outline the

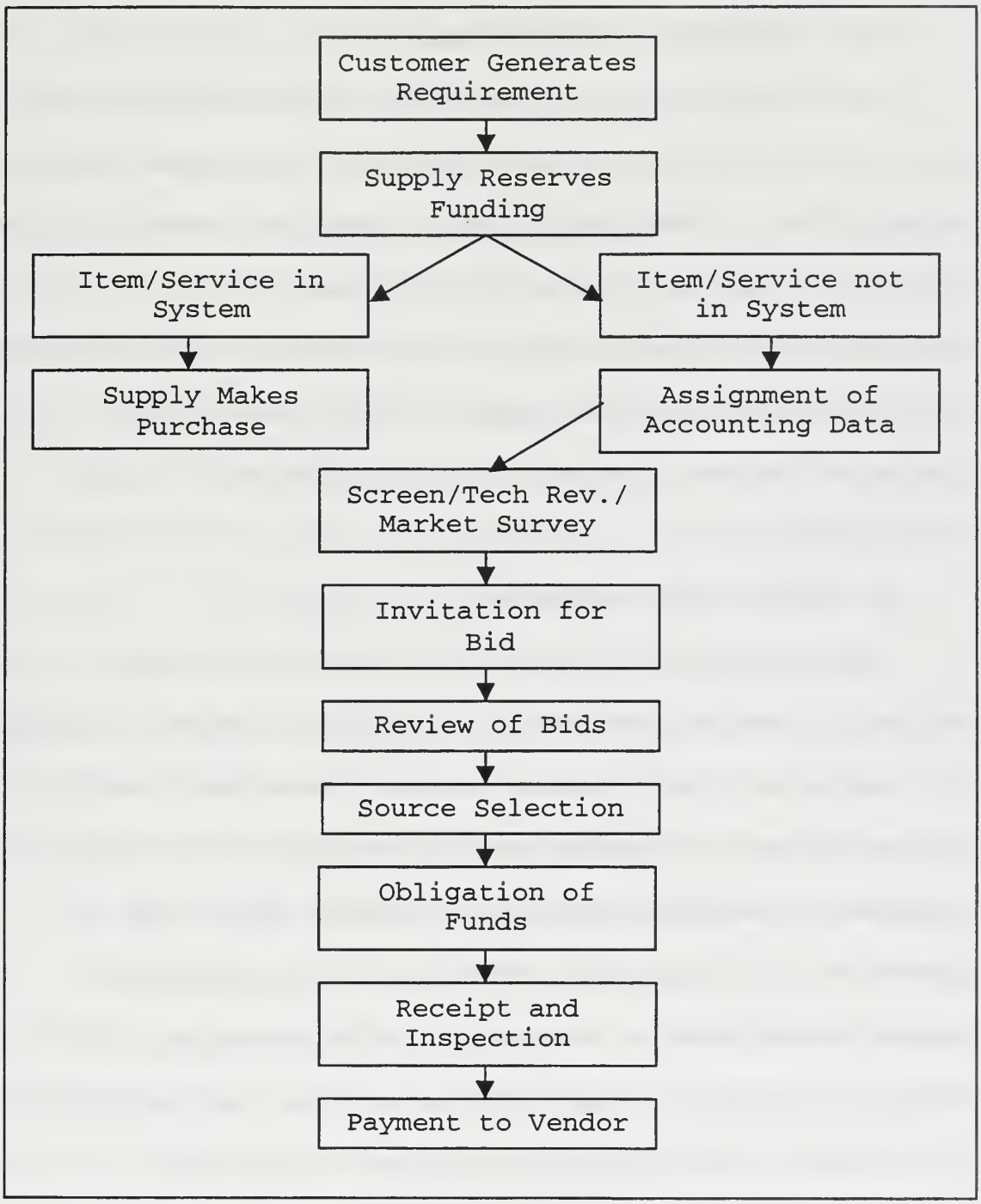


Figure 1. Pre-Credit Card Acquisition Process

procedures used prior to the implementation of the Government Wide Commercial Credit Card Program for

purchases under the Simplified Acquisition Threshold of $100,000.

1. Generation of Requirement

The first step in the pre-credit card process is for the customer to clearly identify their requirement to the Supply Office. The description of supplies or services is listed on a local purchase request form or DD 1348, identifying the item, urgency designator, quantity required and potential sources of supply. Once the customer completes the purchase request it is submitted to the Supply Office.

2. Reservation of Funds

Upon receipt of the purchase request the supply officer first verifies the availability of funds. If funds are available, the funds are reserved using the local purchase request by deducting the estimated cost of the supplies or services from the customer's account on a spreadsheet or database. After ensuring appropriate funding are available, the supply officer obtains any further authorization and/or approval from the Commanding Officer for the purchase of the items or services.

3. Review of Requisition by the Supply Officer

After the reservation of funds, the supply officer then validates the requirement to ensure that the supplies

or services represent a valid requirement for the Command. If the supplies or services represent a valid requirement, the supply officer determines if a National Stock Number (NSN) exists and if the supplies or services can be procured in the supply system. If an NSN does exist, the supply officer initiates the purchase through the supply system. If an NSN does not exist, the supply officer forwards the purchase request to the Comptroller who assigns the accounting data to the purchase request and returns it to the supply officer. Concurrently, the supply officer validates that the supplies or services are not available in the Federal Supply System (FSS), cannot be acquired at Defense Reutilization and Marketing Office (DRMO) and cannot be acquired from another Command's excess equipment. Once these steps have been completed, the purchase request is forwarded to the Contracting Office.

4. Screening, Technical Review and Market Research

Upon receipt of the purchase request, the Contracting Officer's purchasing agent checks the request for accuracy and completeness. Further, mandatory sources of supply are again verified, and items are screened against primary sources to determine if the purchase can be made from an FSS or other mandatory sources. If the items cannot be requisitioned from an FSS or other mandatory sources, the

recommended source of supply is validated again, and additional market research is conducted before the requisition is passed to the Contracting Officer for purchase.

5. Request for Quotation

Once the purchase request passes the screening and technical evaluation, and potential sources are identified, the Contracting Officer prepares and issues an invitation for bid (IFB) and advertises the requirement in the Commerce Business Daily. One or more contractors interested in bidding for the work may submit proposals or quotations (e.g., bids).

6. Review of Bids

The Contracting Officer analyzes each bid to determine if it is responsive and responsible. For example, do the bids reflect a clear understanding of the requirement? For the bids that are determined to be responsive and responsible, the Contracting Officer determines the competitive range.

7. Source Selection

The Contracting Officer then uses the source selection process identified in the IFB, evaluates the proposals and makes a determination of which represents the best value to the Government.

8. Obligation of Funds/Requisition

Once the requisition successfully passes through the Source Selection phase and a source of supply is identified, the Contracting Officer then prepares a DD 1155 to be used as the purchasing vehicle for the supplies or services. Once the Contracting Officer signs the DD 1155, the form is returned to the purchasing agent, who places the order for the supplies or services with the vendor.

9. Receipt of Supplies/Services and Inspection

Receipt of supplies or services is the next step in the requisitioning cycle. As the receiving location takes delivery of the supplies or services, they use a copy of the DD 1155, to receive and inspect all incoming material, verify quantities and forward the material to the proper location. A receiving report is then forwarded to the Contracting Officer informing him that the terms of the contract have been satisfied and the invoice and contract can be forwarded to Defense Finance and Accounting Service (DFAS) for payment.

10. Payment to Vendor

The purchasing agent, using the receiving report, invoice and DD 1155, verifies all supplies and/or services have been received by the Government according to the terms and conditions of the contract. Once all information is

verified, the receiving report, the invoice from the vendor, and the DD 1155 is forwarded to DFAS. DFAS again verifies that all supplies and services have been received according to the terms and conditions of the contract, using the receiving report, the invoice and DD 1155. DFAS also confirms all charges on the invoice are correct. Once all charges were verified and final corrections made, DFAS issues payment to the vendor.

C. CREDIT CARD PROCESS

1. Implementation of the Credit Card Program

The need for acquisition reform has become more evident since the 1980s. Prior to President Reagan taking office in 1982, defense spending had been on the decline and by 1981 only represented 5.2% of Gross Domestic Product (GDP). However, this spending pattern would soon reverse as President Reagan assumed office in 1982 and Defense spending became one his top priorities. Unfortunately, many issues (e.g., the combination of dramatic increases in Defense spending and disclosures of bribes for inside information on competitive bids, use of contract specifications to favor one contractor over others, and collusive bidding by contractors) raised questions about the procurement process and damaged the Pentagon's reputation. [Ref. 14] By the late 1980s the procurement

process had become a burdensome process with layers of regulations and agency orders to ensure there were not recurrences of fiscal misspending such as "Ill Wind", which involved billions of dollars of procurement fraud in Government Contracts, disclosed in the summer of 1988. [Ref. 15]

Due to these events, layers of regulations were implemented as checks and balances to the procurement process to ensure these events were not repeated. Although the checks and balances gave Congress and other high level officials a sense of security, these same laws proved to be a great hindrance to the acquisition process. Thus, the need for acquisition reform had become more imperative.

One of the moves that had the biggest impact on the procurement process was the implementation of the credit card process. Credit cards took a process, layered with checks and balances, and streamlined it. They also provided the customer with more responsive support, vendors with faster payments, and individual cardholders and approving officials with greater empowerment. Thus, cardholders and approving officials could now provide the responsive support demanded by their customers.

2. The Credit Card Process

The following paragraphs and diagram outline the credit card process and identify adaptations from the pre-credit card process baseline. Only those steps deleted or modified from the baseline are discussed (shaded in gray).

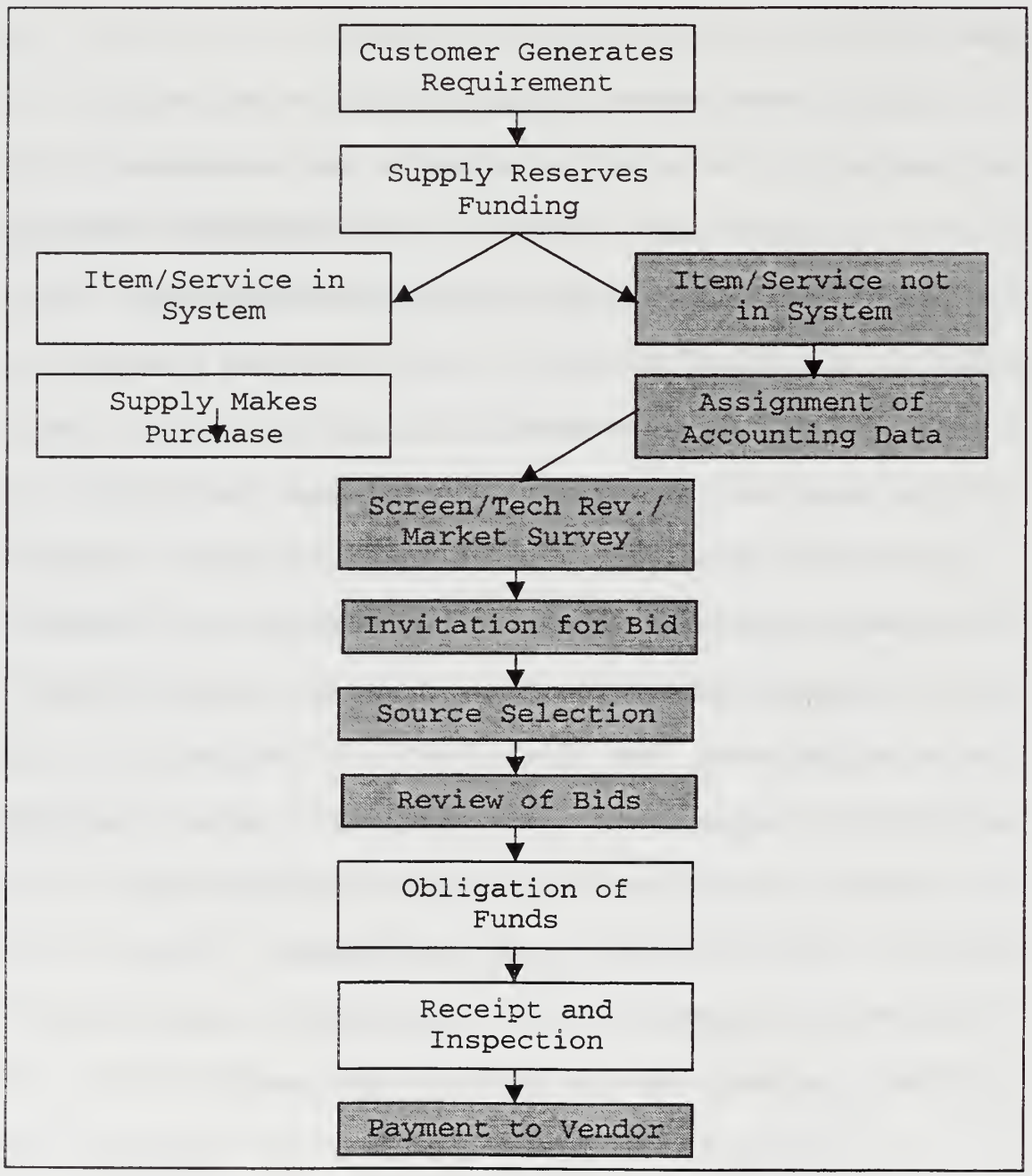


Figure 2. Credit Card Process for Acquisitions

a. Review of Requisition by the Supply Officer

The first noticeable change due to the implementation of the credit card process occurs when the supply officer reviews the requisition. During this phase, the supply officer validates the requirement to ensure the supplies or services represent a valid need for the Command as well as to review the request for accuracy and completeness. If the supplies or services do represent a valid requirement, the supply officer determines if a National Stock Number (NSN) exists and if the supplies or services can be procured in the supply system. If an NSN does exist, the supply officer initiates the purchase through the supply system. However, if an NSN does not exist, and the requisition cannot be satisfied by in the supply system or on schedule, the credit cardholder forwards the purchase request to the supply officer for approval. The supply officer is now empowered to execute the purchase if the value of the requisition does not exceed $2,500 and the following steps are completed.

b. Assignment of Accounting Data

Since the credit card is used to make the purchase, there is no requirement for the supply officer to obtain accounting data from the Comptroller. This information is provided to the supply officer when the

credit card program is implemented. Thus, when the supply officer receives a requisition, he chooses the line of accounting from the block of accounting data assigned to him by the Comptroller.

c. Screening, Technical Review, Market Research and Source Selection

Previously, this phase was completed by the Contracting Officer's purchasing agent, who checked the accuracy of the purchase request, verified that the supplies or services could not be obtained from a mandatory source and conducted additional market research. Since the implementation of the Credit Card Program, the supply officer's purchasing agent completes these steps upon receipt of the purchase request. During the market research phase, the purchasing agent selects the vendor who represents the best value to the Government.

d. Obligation of Funds/Requisition

Once the credit cardholder receives approval from the supply officer/approving official for the requisition, the credit cardholder makes the purchase using the credit card for payment obligating the funds. It is at this time that the vendor receives payment for the supplies or services. The researcher assumes in this example that the

supply officer also functions as the approving official for credit cardholders.

e. Receipt of Supplies/Services and Inspection

Receipt of supplies or services is the next step in the requisitioning cycle. As the receiving location takes delivery of the supplies or services, they use a copy of the purchase request to receive and inspect all incoming material, verify quantities and forward the material to the proper location. If all supplies and services have been received, the purchase request is signed and returned to the credit cardholder.

f. Reconciliation of Statements

At the end of each month, the credit cardholder receives a statement of all activity for their account. The credit cardholder attaches all purchase requests and invoices to the statement and forwards the information to the approving official. Once the approving official reviews the statement and ensures all documentation is present and no discrepancies exist, the statement is signed and forwarded to the agency program coordinator (APC). The APC then forwards the credit cardholder's statement to DFAS for final payment to the credit card company.

3. Benefits of the Credit Card Program

As we have seen from the processes described in the preceding paragraphs, the implementation of the Commercial Credit Card Program has streamlined the acquisition process. The data illustrate that buying supplies and services prior to the implementation of the Commercial Credit Card Program was a decentralized and inefficient process that could take weeks - even months - before employees received the items needed. [Ref. 4]

Prior to 1994, credit card use was strictly limited to purchases under the micropurchase threshold of $2,500. However, since the implementation of FASA, the White House, Congress, DoD, Army and Industry have worked in concert to change laws and regulations. They have eliminated the "red tape" in the acquisition process and allowed the purchase card to be used as a payment vehicle above $2,500. They have also invoked the use of simplified acquisition procedures to streamline the acquisition process. Now the purchase card can be used by Contracting Officers for purchases up to $25,000 and as a payment vehicle to streamline the closeout process on contracts up to the Simplified Acquisition Threshold (SAT) of $100,000. These barriers are lifted further during declared contingencies when the SAT grows to $200,000. The simplified acquisition

procedures permit streamlined competition with less paperwork and reduced processing times, spurring on additional use of the commercial credit card. [Ref. 17]

The following data gathered from the General Services Administration (GSA) Homepage and a briefing given by the DoD Purchase Card Program Office depict the fiscal year growth of the Commercial Purchase Card Program.

FISCAL YEAR	SALES	TRANSACTIONS	CARDHOLDERS
89	$460,612	2,326	10,489
90	$56,312,535	270,983	18,926
91	$140,735,006	639,389	30,336
92	$275,573,665	1,058,890	44,532
93	$472,103,391	1,512,275	74,591
94	$808,473,245	2,471,308	82,804
95	$1,591,773,703	4,248,496	130,353
96	$2,914,368,604	7,327,878	209,295
97	$5,045,264,294	11,593,616	264,505
98	$7,960,818,860	16,447,721	340,078

GSA Homepage

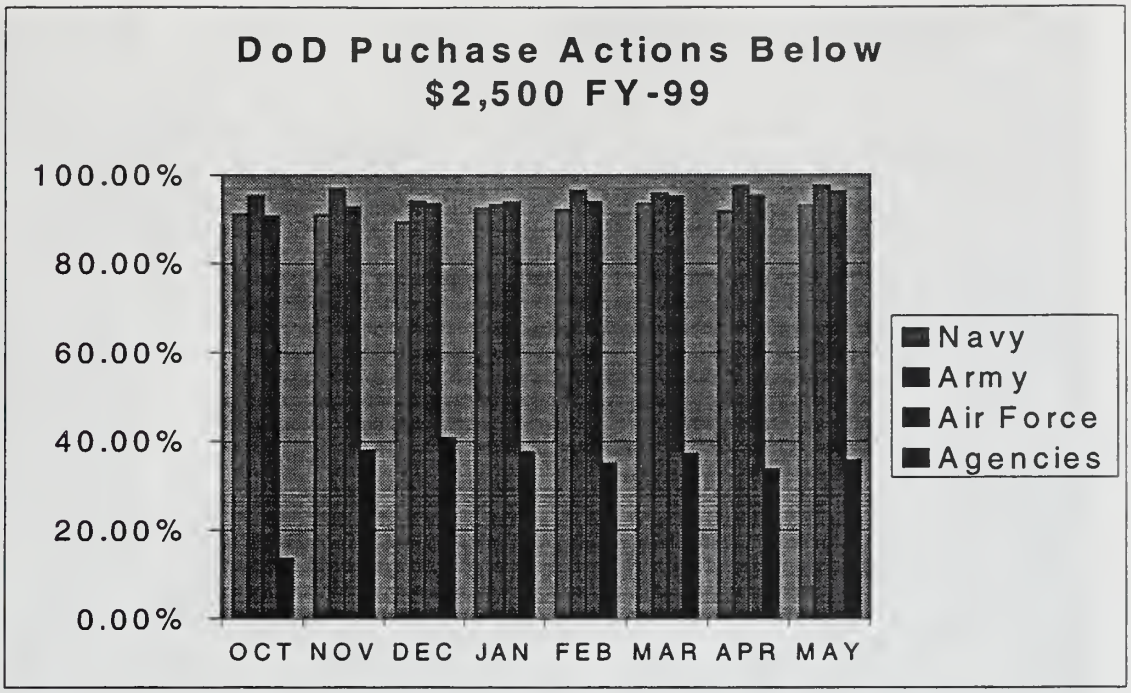
Table 1. Growth of the Purchase Card Program

As is evident from the data depicted, the number of transactions has dramatically increased due to the implementation of FASA in 1994. By 1995, the number of transactions had doubled in use compared to years prior and tripled by 1996.

The greater use of the card has "dramatically reduced acquisition cycle time and the paperwork associated with making and paying for procurement actions, thus reducing costs and improving timeliness". [Ref. 8]

Studies at the Defense Logistics Agency (DLA) estimate that use of the International Merchants Purchase Authorization Card (IMPAC) reduced administrative expenses by $70 million during a five year period and reduced acquisition cycle time from an average of 29 days to less than 5 days. [Ref. 8] Another study at the Department of Agriculture disclosed the cost per transaction has dropped almost 80%, from $77 to $17. The Agency is now estimating it will save $29.5 million annually due to the implementation of the Commercial Credit Card Program [Ref. 2] It is interesting to note that as of the date of this article, the Department of Agriculture is only authorized to use the credit card for purchases under $2,500. [Ref. 2]

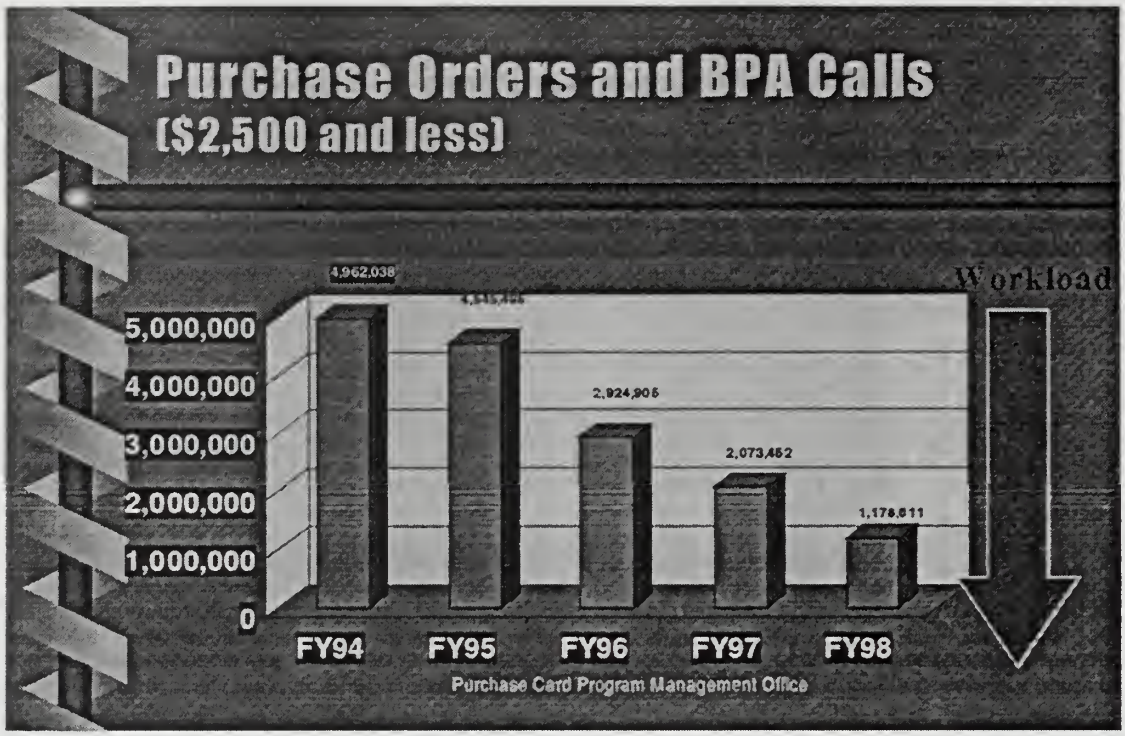
For Fiscal Year 1999, DoD has executed over 93% of all micropurchases with the commercial credit card to date, totaling 3,874,012 transactions. As a result of the tremendous efficiencies of the credit card, the use of less efficient contracting vehicles for small purchases has decreased. This conclusion is supported both by the data in the previous table, the growth of the Purchase Card Program and the graph on the following page depicting DoD Purchase Card Actions for FY-99.



DoD Purchase Card Program Office Homepage

Figure 3. DoD Purchase Actions for FY 1999

Additionally, the use of the Blanket Purchase Agreement (BPA) has dramatically declined over the past five years, thus representing a significant decline in the management and overall workload of the contracting office. As of 1 Apr 1999, the number of BPA calls made was 1,176,611. This represents a decline of 43% of BPA calls from the year prior and an overall decline of 76% since the implementation of FASA. The decline in BPA usage since FY-94 is depicted in the graph on the following page.



Purchase Card Program Briefing 1 Apr 1999
given by Program Manager

Figure 4. Purchase Orders and BPA Calls

Previous research conducted at the Naval Postgraduate School has estimated that the average time to conduct one BPA call is 49 minutes. [Ref. 16] In 1995 another Naval Postgraduate School study determined the average time to conduct one purchase transaction using a purchase card to be 41 minutes. [Ref. 10]

Although a workload decrease of 8 minutes may not appear on the surface to be significant, it represents a shift in workload requirements (e.g., the execution of all micropurchases) from the Contracting Office to the user at the Supply Office. This shift in workload, from the

Contracting Office to hundreds of cardholders, satisfies customer needs quicker and streamlines the process which previously could only be accomplished by a small number of purchasing agents in the Contracting Office.

4. Disadvantages of the Credit Card Program

The drawbacks to this process are few, but merit noting. First, currently, some contractors were unwilling to accept the Government Purchase Card for payment due to the 2-3% merchant fees they must absorb on the associated sales volume. [Ref. 7] The credit card companies are now introducing lower merchant fees that charge .75% of volume, plus a $40 transaction fee on all transactions over $5000. [Ref. 7] In addition to lower fees, the card offers contractors the opportunity of quicker payment, eliminating the draconian payment process of DFAS.

Second, there is a program to continuously assess the potential for fraud within the DoD Purchase Card Program. A pilot phase was conducted from January through June of 1998. During this period, 1400 credit card transactions were identified from the merchant category code (MCC) and highlighted as suspect and potential indicators of fraud. Of the 7.5M transactions conducted during this period, 1400 transactions were suspect and 202 were downselected for further analysis of fraud or misuse. The results of the

analysis found 15 uses were fraudulent and represented misuse of the credit card, 65 transactions had an incorrect MCC in the transaction, 107 transactions were authorized and proper.

The current inspection and analysis program has been further refined since Phase I of the pilot program. The analysis of Phase II is currently in progress. Of the 8M transactions conducted between July 1998 and February 1999, 1000 transactions were identified as suspect from the MCC and vendor codes and 86 were downselected for field research. All transactions were found to have an incorrect MCC except for one individual's account whose card had been stolen. Those transactions have been disputed and resolved.

This fraud detection program is identifying coding problems within the credit card program that are being corrected such as incorrect MCCs. However, they have found that robust internal controls are imperative for a successful credit card program.

The DoDIG has found instances in the past, for example, of three Petty Officers purchasing $200,000 of furniture to furnish their apartment. During the investigation, it was found that the Petty Officers who were functioning as cardholders had been authorized by the

approving official (AO) to certify their own invoices for payment, violating the Purchase Card regulations. This example reinforces the findings above that strong internal controls are vital to the preservation of the Purchase Card Program and the prevention of fraud.

The final and most significant disadvantage of the credit card program has been in the area of late payments and delinquencies for which DoD pays interest. As of 1 July 1999, all but one agency was delinquent in payments to its respective credit card company. However, all made significant progress in reducing outstanding debt since the beginning of the year in comparison to years prior. For example, the Navy's total outstanding debt as of 28 February 1999 was $11 million. By 30 June 1999, the balance with its respective credit card company represented an overpayment of $100,000. When analyzing the cumulative data for the Navy's delinquency, we find the amount delinquent begins to surge by the 30 November invoice, peaking in the January and February invoice, and then returns to normal operating level by the 31 March invoice.

In order to prevent DoD from paying lagging interest bills, Citibank, which was awarded the current credit card contract for the Navy, is instituting a paperless process. In this web-based process, the invoice is sent to the

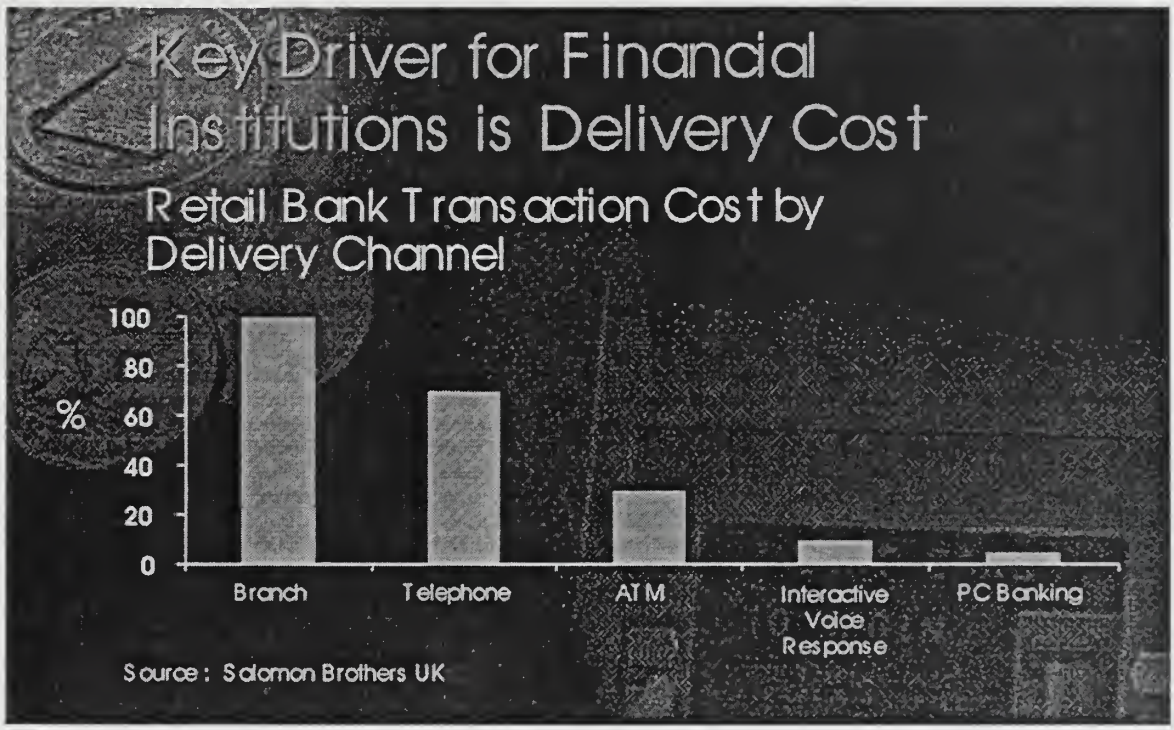
cardholder electronically. The cardholder validates all charges and then forwards the invoice to the approving official for certification. The invoice is then sent electronically to the APC, who in turn forwards it to DFAS for final payment. Citibank and the Navy will have the ability to track the payment process for each invoice and identify Commands that are delinquent in payments. Additionally, Citibank is enticing the Navy to make payments on time or early by providing an alluring rebate program where the Navy will receive a rebate for each invoice paid early.

5. Summary of the Credit Card Process

The Credit Card Program is providing a streamlined process born from the initiatives in FASA. This process continues to maintain a proven track record and has the ability to continually be re-engineered to meet the changing needs of DoD. Citibank has begun the process of meeting the initiatives of Deputy Secretary of Defense, Dr. John Hamre, for a paperless acquisition organization by the year 2000.

"Today speed, connectivity and tangibles are driving industry." [Ref. 1] In order to keep up with industry's demands the Navy must ensure its capabilities and programs remain current. One of the key drivers for financial

institutions is delivery cost. Since the advent of the personal computer and the Internet, financial institutions are finding quicker and cheaper means to serve their customers. The following graph depicts cost as a percentage of each transaction for a specific banking function.



U.S. Navy/Marine Corps Worldwide FY99 Purchase Card Conference 28-29 July 99

Figure 5. Key Driver for Financial Institutions is Delivery Cost

From this figure we can see that the financial industry has found a way to provide faster service and provide their clients with more accurate information for a lesser cost.

In today's environment of declining funds and increasing public scrutiny, DoD must continue to refine its

processes to maintain its operational tempo and goals. Despite considerable progress, DoD's credit card process constitutes a process that can still benefit from further innovation to better meet the demands being placed on the Navy. Process innovation demonstrates one method of analysis of the Credit Card Program that can further refine the process, making it faster, better and achieving savings for DoD.

D. PROCESS INNOVATION

In 1997 DoD conducted the Quadrennial Defense Review (QDR) of defense posture, policies and programs which identified threats, areas of risk and opportunities out to the year 2015. This comprehensive review was the foundation for the Defense Reform Initiative (DRI) which

> is aggressively applying to the Department the key business principles that American industry has successfully used to become leaner and more flexible in order to remain competitive. The resulting savings will help fund the 'Revolution in Military Affairs', to ensure American military superiority in the future. Equally important, the DRI is aimed at ensuring that DoD support elements are agile and responsive to support the warfighters, who are rapidly applying new technologies to change the way they fight. [Ref. 9]

The new Purchase Card Program satisfies both these initiatives and DoD's goal to become a paperfree acquisition organization. DoD came to the realization in

the late 1980s that it could not continue to fund the growing costs of writing and processing small dollar contracts which had the potential to exceed $330 per transaction. [Ref. 9] The implementation of the Commercial Credit Card Program not only achieved that goal, but has laid the groundwork for the new Purchase Card Program.

Competition is driving the American economy, and has led American firms to become "global leaders in innovation, cost performance and technological development". [Ref. 9] The champions of the Purchase Card Program intend to reap the benefits of this competition in DoD's reform initiatives by taking the Purchase Card Program to a new level focusing on the success of Citibank and US Bank's leadership in information technology.

The implementation of the Purchase Card Program is itself an innovation. It took a process that was layered in redundancy, analyzed the process, and made a broad cross functional change. Today DoD and in particular, the Department of the Navy, are evaluating the credit card process. The champions of the DoD Purchase Card Program intend to continue the innovation that began in the early 1990s by ascertaining new ways to make the process more efficient, easier to use and more responsive to the customer. In order to accomplish these objectives, DoD is

focusing on enablers such as information technology, structural change and process flow to drive innovation. Thus, now is an opportune time for an analysis of the DoD Purchase Card Program for process innovation as the Navy and DoD take the DoD Purchase Card Program into the 21st century.

1. Innovation vs. Process Improvement

Merriam Webster's Dictionary defines the word process as "a natural phenomenon marked by gradual changes that leads toward a particular result or a natural continuing activity or function". It also defines the word improvement as "the act or process of improving, the state of being improved, enhancing value or excellence". Combining these two concepts gives us the foundation for the concept of process improvement.

Process improvement is a change made gradually or in steps. "Process improvement involves performing the same business process with slightly increased efficiency or effectiveness." [Ref. 6] It takes a focused look at an existing process from a bottom's up methodology and focuses on improving a specific process thereby adding value or increasing efficiency only within a particular functional unit or a department, generally of a relatively low level. The process improvement approach does not have a defined

end, but looks at redundant processes or non-value added steps and attempts to eliminate those practices under the assumption that improvement is a continuous process.

Merriam Webster's Dictionary defines innovation as "the introduction of something new, a new idea, method, or device". As we can see from this definition, innovation involves introducing a new studied approach into a business process. Davenport defines process innovation as

> stepping back from a process to inquire into its overall business objective, and then effecting creative and radical change to realize order-of-magnitude improvements in the way that objective is actually accomplished. [Ref. 6]

Process innovation is an analysis of not only the entire process, but of how that process meets the overall objective of the business. By making a studied, yet radical change, process innovation has the potential to significantly reduce costs and improve efficiency.

Davenport differentiates process innovation from process improvement in the table on the following page.

	Improvement	Innovation
Level of Change	Incremental	Radical
Starting Point	Existing Process	Clean Slate
Frequency of Change	One Time/Continuous	One Time
Time Required	Short	Long
Participation	Bottom Up	Top Down
Typical Scope	Narrow within Functions	Broad Cross Functional
Risk	Moderate	High
Primary Enabler	Statistical Control	Information Technology
Type of Change	Cultural	Cultural/ Structural

Table 2. Process Improvement versus Process

Source: Davenport's Process Innovation

2. Davenport's Methodology

Davenport's framework for process innovation embodies five major phases: 1) identifying processes for innovation, 2) identifying change levers, 3) developing process visions, 4) understanding existing processes, and 5) designing and prototyping the new process. Each is outlined in turn.

a. Identifying Processes for Innovation

The steps involved in this first phase are as follows:

1) Enumerate Major Processes. In this step the challenge for the organization is not only to identify process definitions and their impact on the organization as a whole, but to determine the appropriate number of processes that reflect a trade-off between managing the process' interdependence and ensuring the process scope is manageable.

2) Determine Process Boundaries. Once the processes have been identified at the principal levels, the organization must define the boundaries of those processes. The owners of the process must understand where the process begins and ends, the relationship between other processes and those subprocesses contained within the process.

3) Assess Strategic Relevance of Each Process. The goal in accomplishing this step is to take the processes most in line with the organization's mission. Since process innovation is a radical change approach and requires a great deal of coordination, in cases of simultaneous innovation projects, the organization must ensure it has a complete understanding of the level of change and potential for upheaval.

4) Render High-Level Judgments of the "Health of Each Process". Within this step the organization must prioritize processes that are problematic

and in need of obvious improvement. The processes that receive the highest priorities should be innovated first.

5) Qualify the Culture and Politics of Each Process. Additionally, the cultural and political climate must be evaluated in consideration for selection of the process. Not only must the organization have a champion for process innovation, it must have strong commitment to follow through with the innovation.

b. Identify Change Levers

The following steps assist the organization in identifying change levers that drive process innovation.

1) Identify Potential Technological and Human Opportunities for Process Change. The first step in the identification of change levers is to analyze both the technological and human factors affecting the process. Organizations must ensure they do not focus on achieving a change through information technology (IT) alone or another technological capability. IT must be viewed as one of several enablers of change for process innovation. [Ref. 6]

2) Identify Potentially Constraining Technological and Human Factors. The next step in this phase is to determine if, of the technological and human change factors identified, any of the factors represent a constraint to process innovation. In this step the

organization must decide, which, if any, constraining factors will be accepted as constraints and which the organization try to overcome.

3) Research Opportunities in Terms of Application to Specific Processes. In this step the organization analyzes potential opportunities that, if put in place, would achieve organizational goals and innovate the process. Analysis remains the key in this process. The organization must look at enablers from all sides to ensure they reveal quantum improvements. For example an organization

> ..might decide to institute a case manager position - an empowered individual at the customer interface aided by a powerful workstation-as part of a process innovation. But a study of the required skill set of employees reveals that retraining the staff would not be possible; implementing a case manager model would require replacing the current staff.. [Ref. 6]

4) Determine Which Constraints Will be Accepted. The final step in this phase is to take the constraints identified at the top level and determine those that the organization will attempt to overcome and those that will be left for later consideration. Analysis of the process is still at a high level within the organization during this step.

c. Developing Process Vision

Successful completion of this phase is key if the innovation of the process is to succeed and become part of the organizational process and structure, as it must produce a champion of the innovation with a clear vision.

1) Assess Existing Business Strategy for Process Directions. In order for process innovation to succeed from this point, the organization must have a well-defined strategy to "guide and inspire their process innovation". [Ref. 6] The organization's strategy should have an equal mix of the following qualities: measurable, focus on specific functions, inspirational and long term.

2) Consult With Process Customers for Performance Objectives. Key to the success of process innovation for an organization is to have a complete understanding of the customer's requirements and viewpoint. The organization should seek to obtain outputs such as performance, flow and other encompassing process recommendations. Consulting with customers during this step will be instrumental in the implementation of the process innovation change.

3) Benchmark for Process Performance Targets and Examples of Innovation. In this step the organization selects one or more companies on which to benchmark its performance. The organization needs to consider other companies that have similar processes. However, those companies need not be within the same industry. For example, a Government agency or military unit can benchmark itself against a commercial firm.

4) Formulate Process Performance Objectives. During this step the organization takes the process vision that is developed from the organization's strategy and develops process objectives. These objectives include the process goal, improvement desired, measurable benchmark and time to be completed.

5) Develop Specific Process Attributes. The focus of this step is to develop descriptive and nonquantitative factors that satisfy both the process objectives and characterize the vision. These factors are generally categorized into characteristics such as technology, people and process outputs.

d. Understand Existing Processes

The key to success in the fourth phase is to have a complete understanding of the process flow before a new

one is designed. Davenport lists four reasons why documentation of the process flow is imperative. [Ref. 6]

1. Understanding existing processes facilitates communication among participants in the innovation initiative.

2. In most complex organizations there is no way to migrate to a new process without understanding the current one.

3. Recognizing problems in an existing process can ensure that they are not repeated in the new process.

4. Understanding the current process provides a measure of value of the proposed innovation.

1) Describe the Current Process Flow. As stated above, the key in this step is describing the current process flow as it sets the stage for additional analysis and lays the groundwork for a process innovation approach. Understanding the current process flow requires an in-depth analysis, yet it should be completed within a few weeks. The description allows members of the process innovation team to view all of their functions in a visual manner and ensures a better understanding.

2-3) Measure and Assess the Process in Terms of the New Process Objectives. The next two steps in this phase are to measure the current process in terms of performance objectives, assessing the quantitative objectives as identified in the process objectives, and

assess the attributes as laid out in the process vision. These steps give the process innovation team a quantitative look at the current process and provide indicators of "troubled" areas in the current process to assist them in developing a new process that meets the attributes of the process vision.

4-6) Identify Problems with or Shortcomings of the Process, along with Short-Term Improvements in the Process, and Assess Current Information Technology and Organization. The combination of the next three steps allows the process innovation team to begin implementing short-term improvements into a process that can take several years to complete. By allowing implementation of short-term improvements, the process innovation team can begin viewing results of the new process as a "vehicle for funding process innovation over the long term". [Ref. 6]

e. Design and Prototype the New Process

The final phase of the process innovation cycle is largely dependent on the creativity of the people on the process innovation team as well as their ability to take the information gathered in the previous phases, analyze and synthesize that information and develop a new process. The individuals that should be present on the process innovation team at this point are the key members of the

organization and those that have a stake in the implementation of the new process.

1) Brainstorm Design Alternatives. The best technique for this step is to have the members of the design team share and brainstorm their ideas in an atmosphere of nonattribution. The objective in this step is to develop creative pragmatic new designs through a complete understanding of the process vision, enablers for change and the knowledge developed from the process benchmarks. [Ref. 6]

2) Assess Feasibility, Risk and Benefit of Design Alternatives and Select the Preferred Process Design. As each of the brainstorming workshops develops a solution to the process, the new process must be analyzed for feasibility, risks and potential benefits. Senior mangers along with expert technical business specialists are often quite good at identifying these aspects of new process designs, and simulation can be used effectively to identify potential bottlenecks and problem areas associated with various redesign alternatives.

3) Prototype the New Process Design. During this step the prototype design of the new process will be tested within the organization on a small scale. The designers focus on the fit of the new process in the

structure, information technology and the organization. The designers look at the process as it affects the organization during the testing phase and then begin to polish the process. The cycle of testing and polishing may take several iterations. However, this cycle helps ensure a proper fit in the organization, as well as allowing feedback from the user.

4) Develop a Migration Strategy. Depending on the size and overall impact of employing the new process, the organization may choose to phase in the program if full implementation is evaluated as too risky. A useful migration strategy often takes the form of first gathering "low hanging fruit" or first striving to reach the easiest redesigns with the largest payoffs. For example, changes in process workflow (e.g., performing certain activities in parallel) are relatively straight forward to effect and can generate substantial performance improvement in terms of cycle times. Alternatively, changes in organizational structure and culture are notoriously difficult to achieve, but payoffs can be huge. Changes invoking IT often fall somewhere in between these two.

5) Implement New Organizational Structures and Systems. This is the final step in Davenport's process innovation framework. Here, the migration strategy is executed and the process innovation for the organization is completed.

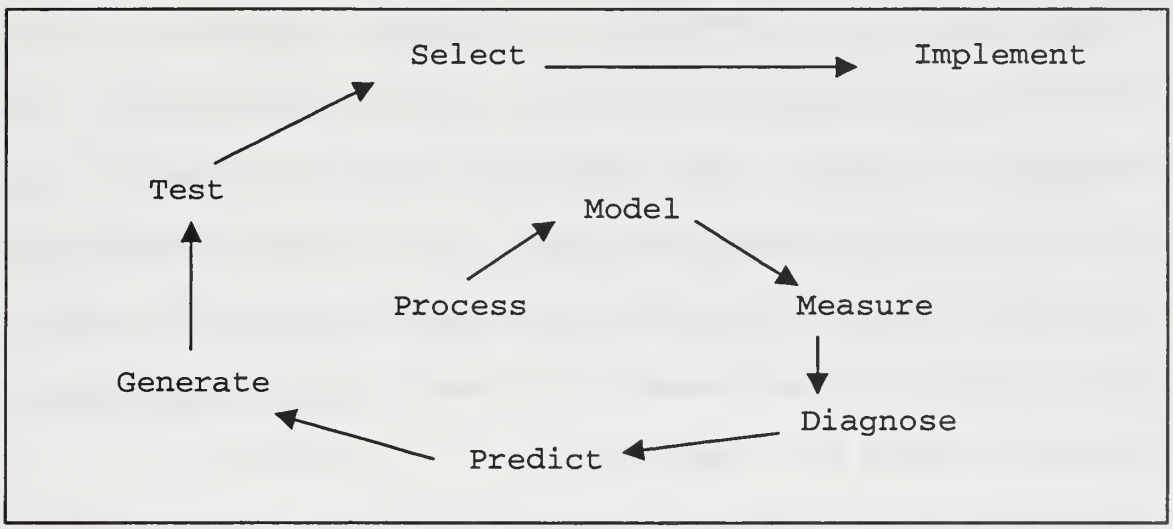
3. Knowledge-Based Organizational Process Redesign (KOPeR)

The backbone of Davenport's process innovation framework is the analysis of the current process. He notes that in order to effectively analyze a process, a thorough understanding of the overall business objective as well as the current process is essential. By having a clear documented understanding of the process, participants among the process innovation team communicate efficiently and can establish a baseline from which to evaluate the effectiveness of the redesign alternative. Additionally, this technique ensures problems in the existing process are not repeated in redesign alternatives.

Although the Davenport framework outlines the steps required for effective process innovation, it has surprisingly little to say about how the steps should be accomplished, particularly with respect to designing and prototyping a new process (e.g., the final step). To fill this gap, Nissen [Ref. 12] augments the Davenport framework

through a redesign method and tool called KOPeR for Knowledge-Based Organizational Process Redesign. KOPeR emerged from the information technology arena and integrates some of the most "powerful methods and technologies of artificial intelligence (AI) with a number of expert reengineering methodologies" to support business process redesign. [Ref. 12]

Figure 6 depicts the methodology used in the KOPeR redesign method. KOPeR uses process measurements to



Acquisition Review Quarterly

Figure 6. KOPeR Redesign Methodology [Ref. 11]

identify pathologies and shortcomings of a process and focuses its formalized reengineering knowledge to determine which redesign changes can generate the most dramatic performance improvements. As redesign alternatives are developed, they are validated and simulated against the baseline to evaluate each critical performance

characteristic. In doing so, KOPeR reduces the "inherent risks of reengineering before committing time and money to a problematic implementation". [Ref. 12] Although dynamic simulation of redesign alternatives is beyond the scope of this thesis, the KOPeR method and associated tools are employed to further redesign the credit card process.

E. SUMMARY

DoD has invested many years and dollars in acquisition reform. Today's initiatives of a paperless acquisition organization and implementation of better business practices are forcing DoD and the Navy to keep up the demands on industry. The immediate result has been the contract with Citibank and USBank for the new Purchase Card Program. The Navy is leading the way by taking the Credit Card Program to a web-based environment for invoicing and payments, along with implementation of on-line malls linking all of Government's mandatory sites. Additionally, Citibank is studying the requirements for the implementation of smart cards that will provide DoD and the Navy with relevant, accurate data on customer needs. The web-based environment will track invoice certification, ensuring that payments are made on time and DoD does not suffer from huge interest bills. The on-line malls will link all of the Government's mandatory sites so that the

credit cardholder can make a more informed choice in less time. Finally, the smart card will allow DoD to warehouse data on customer needs so mandatory sources can bundle the "right" goods and services, allowing for additional cost savings.

As these new innovations begin a potential life in the credit card program, they will have an impact on the current process. Davenport's framework provides a step by step model for the design and implementation of these process visions. Further, since DoD, Citibank and USBank are investing millions of dollars to change current processes, Davenport's framework also provides a logical approach to assess these process changes and possibly identify additional innovations leading to even greater performance gains.

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III. PROCESS

A. METHODOLOGY

This chapter presents the methodology used to model, measure and redesign the current DoD credit card process using both Davenport's Process Model and KOPeR. The IPT Joint Report of the Purchase Card Program completed in February 1997 validates the process for the DoD Purchase Card Program that is used as a baseline for further analysis in this thesis. [Ref. 12]

The next stage in analyzing the credit card process is to focus on using KOPeR. As noted in the previous chapter, the power of KOPeR is in its ability to reduce the risks of reengineering the credit card process before the program office commits any time or money to implementation.

The first step in the KOPeR methodology is to take the current DoD credit card process and develop a detailed process flow model. This task was completed in chapter two of this thesis where the process was presented in a flow chart. Additionally, a detailed outline was derived which explained the tasks to be completed in each step of the process. Finally, the process flow model presents the sequence for each task in order to achieve the end result.

The next step in the KOPeR methodology is to measure the current DoD credit card process and use the resulting

measurements through KOPeR. One of the benefits of using the KOPeR methodology is that it breaks down a process into specific pathologies which the can then be used to make corrections and improvements in a process. A sample of KOPeR diagnostic measures and their corresponding pathologies is listed in the following table. In each case, measures are computed from the process model. For instance, the first measure, parallelism, is computed directly from the process model (e.g., process size divided by length) and quantifies the degree to which a process flow is laid-out sequentially. The corresponding pathology is that sequential processes tend to take longer (e.g., higher cycle time) to complete than their concurrent counterparts.

Parallelism	Identifies the degree to which a process flow is sequential.
Handoff Fraction	Identifies the level of friction produced in a process caused by the hand off of work from one person to the next.
Feedback Fraction	Identifies the level of rework produced when a checking approach to quality is used.
IT Support Fraction	Identifies the level of IT available to support a process such as decision support systems that can enhance knowledge.
IT Communication Fraction	Identifies the level of IT communications to support a process such as e-mail, shared databases and shared networks.
IT Automation Fraction	Identifies the level of IT available to automate the process such as intelligent agents and expert systems.

Table 3. Definitions of KOPeR Measures and Pathologies

Building on such measurements and pathologies, KOPeR focuses on providing recommendations that can streamline and improve enterprise activities such as those associated with the DoD credit card process. Recommendations for a KOPeR redesign process are matched with diagnosed pathologies using reengineering knowledge stored in the form of rules. The interested reader can refer to an article titled "Reengineering the RFP Process Through

Knowledge-Based Systems" for further detail pertaining to KOPeR. [Ref. 12]

B. PROCESS ANALYSIS

The next step in the methodology is to model and measure the DoD credit card process for analysis by KOPeR. To complete this requirement, the current DoD credit card process must be outlined utilizing attributed directed graphs.

1. The DoD Credit Card Process

The DoD credit card process has seven major stages, each of which contains specific tasks, which are completed in a sequence. Each of the stages is listed below:

1. Requirements Generation.
2. Verification of Funds.
3. Review of Purchase Request.
4. Assignment of Accounting Data.
5. Obligation of Funds.
6. Receipt of Supplies/Services.
7. Reconciliation of Statements.

Figure 7 delineates a top-level process flow for the current credit card process as it stands today. Each of the activities listed in this process is identified by a node in the directed graph. For clarity, the rectangular nodes indicate composite activities comprised of lower-

level sub-process tasks. The oval nodes indicate atomic activities with no subordinate sub-process tasks. Beneath the activity nodes are attributes to identify the following process elements: 1) activity name, 2) role of the agent responsible for its performance, 3)organizational affiliation of the agent, 4) technology employed for process support and communications. This attributed directed graph (A-digraph) contains the basic process information required for KOPeR analysis.

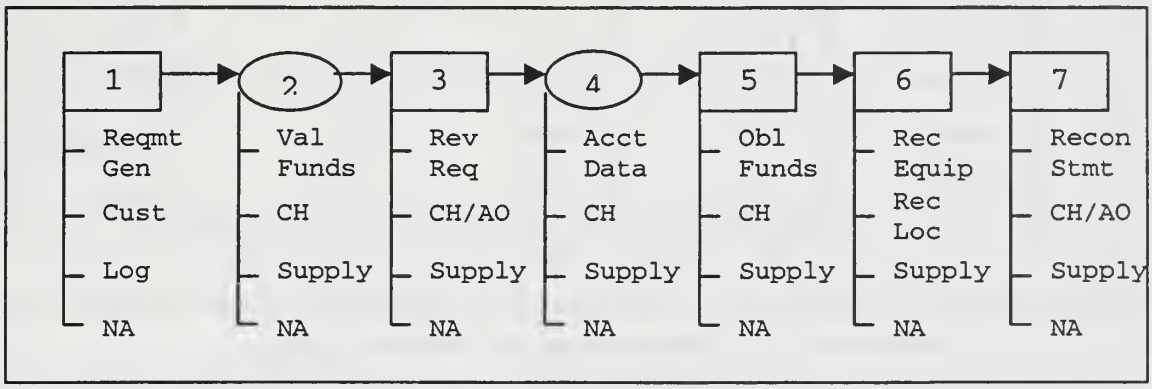

Figure 7. Current DoD Credit Card Process

The first phase of the DoD credit card process begins when the customer (e.g., in the Logistics organization) generates the requirement. This stage begins with the end user who:

1. Identifies the requirement.
2. Identifies a supplier.
3. Completes the purchase request.
4. Forwards the request to the Officer in Charge (OIC).

The flow of work in this stage is depicted in figure 8. Looking at the first node (1) for instance, one can readily identify the four attributes: 1) activity name ("ID Req"), 2) agent role ("user"), 3) organization ("Log"), and 4) technology ("NA"). Attributes corresponding to the other nodes are labeled in similar fashion.

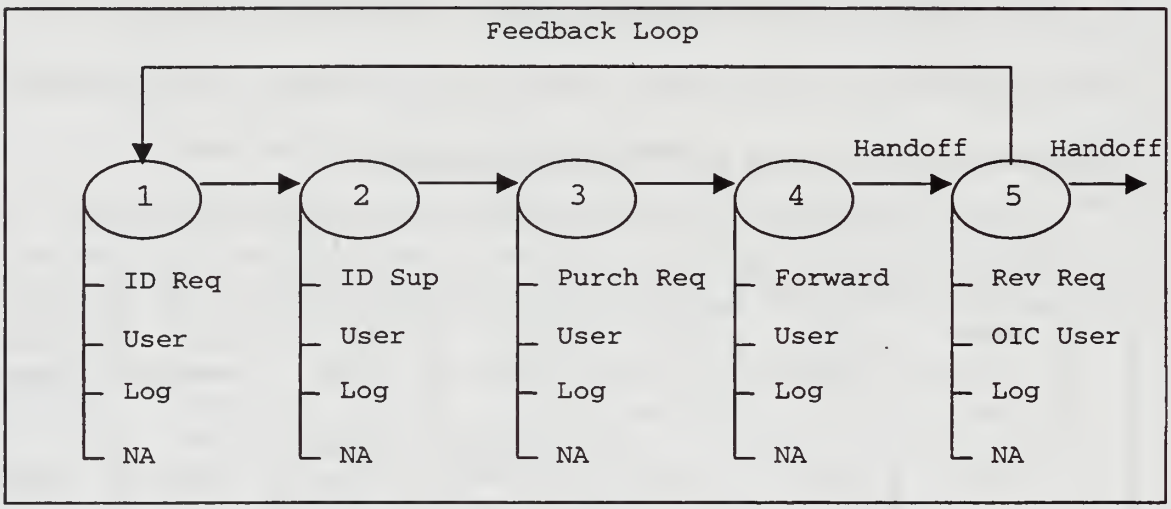

Figure 8. Requirements Generation

Currently, this process is completed without the support of IT (e.g., "NA" technology) to aid the end user (e.g., from the Logistics organization) in identifying a supplier or completing the purchase request. Since this process is paper-based, the user is forced to manually transmit the purchase request to the OIC. Once the hand off is complete and the OIC receives the purchase request, he reviews all tasks in this process to ensure the supplies or services meet the need of the end user. The

responsibility of reviewing all tasks within the process is considered a feedback loop in the KOPeR Methodology.

The next stage in the current DoD credit card process begins as the OIC hands off the purchase request to the credit cardholder in the supply office. This stage contains one task and is depicted in Figure 9.

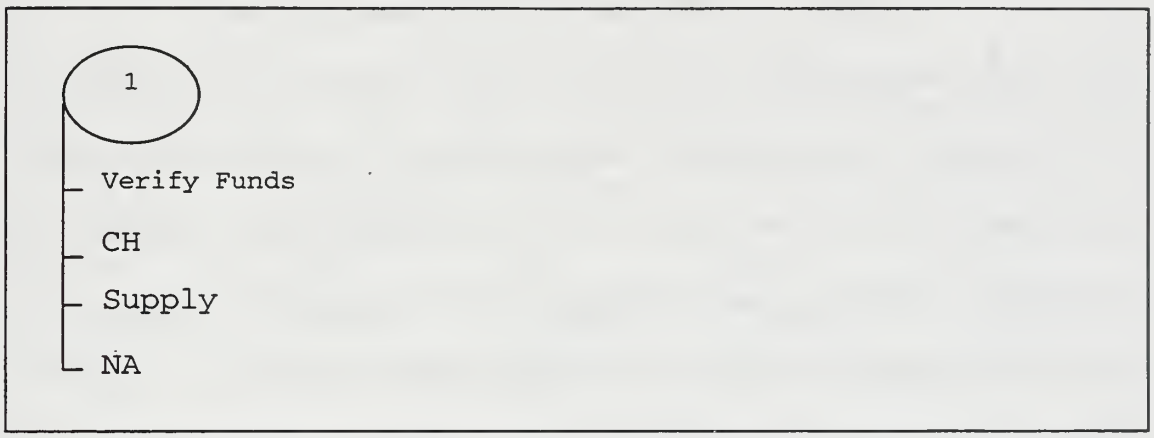

Figure 9. Verification of Funds

When the cardholder receives the purchase request from the customer, he verifies the availability of funds within the customer's account using either a database or a paper based report. Once this task is complete, the process enters its next stage where the cardholder and approving official determine the availability of funds for the requirement.

The third stage of the process begins as the cardholder begins to review the purchase request for accuracy. The workflow of this portion of the credit card process is depicted in the Figure 10.

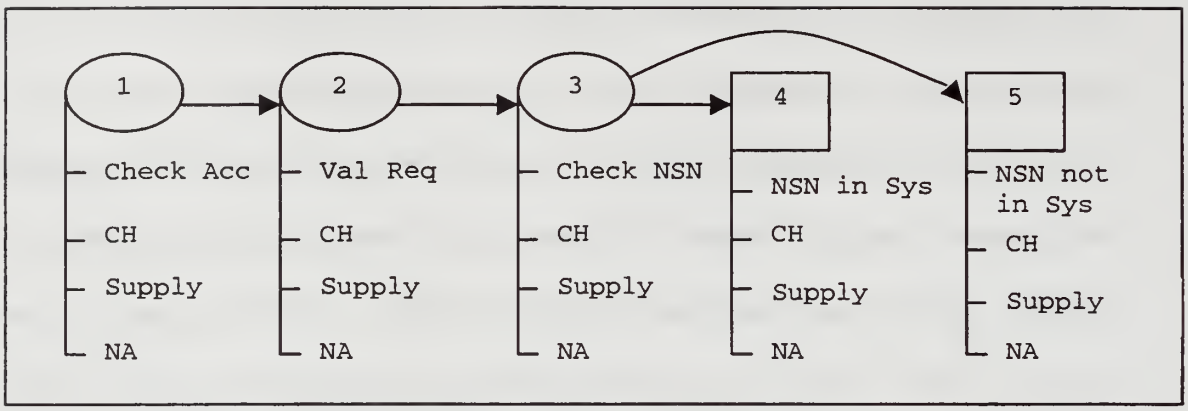

Figure 10. Review of Purchase Request

The cardholder's goal in this stage of the process is to ensure he has a clear understanding of the requirement. His specific duties are to review the purchase request for accuracy (node 1) and determine if the supplies and services represent a valid requirement (node 2). Once these tasks are completed, the cardholder determines if an NSN is available in the supply system (node 3).

If an NSN is available in the supply system (node 4), the cardholder identifies the appropriate information forwarding the purchase request to supply for appropriate action. If an NSN is not available (node 5), the cardholder validates the recommended source of supply (node 6) and verifies the items cannot be obtained from a mandatory source (node 7) such as General Services Administration (GSA). Additional market research is also completed in this phase of the process (node 8) to ensure another source of supply cannot provide the items at a

lesser cost. Once these tasks are completed, the purchase request is handed off to the approving official (node 9) who will review the tasks in this phase. These steps are a continuation of the purchase request review phase and are outlined in Figure 11.

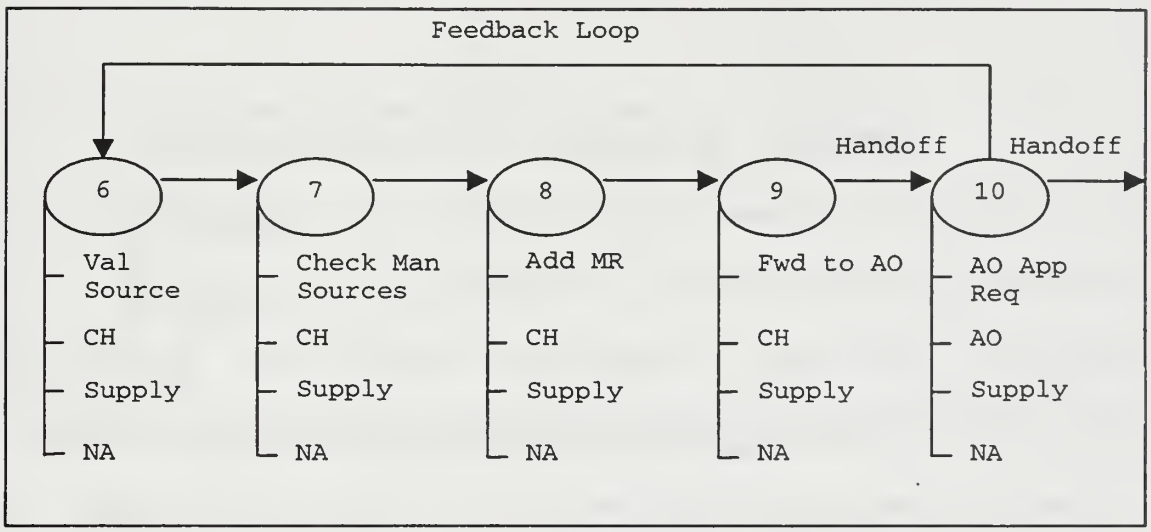

Figure 11. Review of Purchase Request

Once the approving official has reviewed all tasks in this phase and approved the purchase request, a hand off occurs from the approving official to the cardholder starting the fourth phase of the credit card process.

The fourth phase of the credit card process is the assignment of accounting data (see figure 12) and is the only task to be completed in this phase of the process.

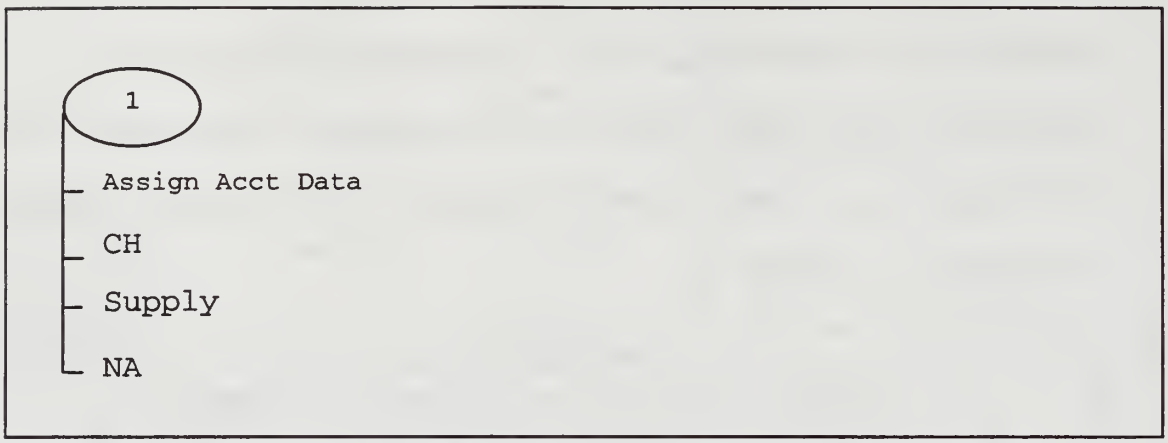

Figure 12. Assignment of Accounting Data

The fifth phase of the credit card process begins once the accounting data is assigned to the purchase request. This phase is depicted in Figure 13. During this phase the cardholder simultaneously executes the purchase (node 1.1) and obligates the funds (node 1.2) utilizing the credit card. The vendor receives payment for the supplies or services when they accept the purchase (node 2).

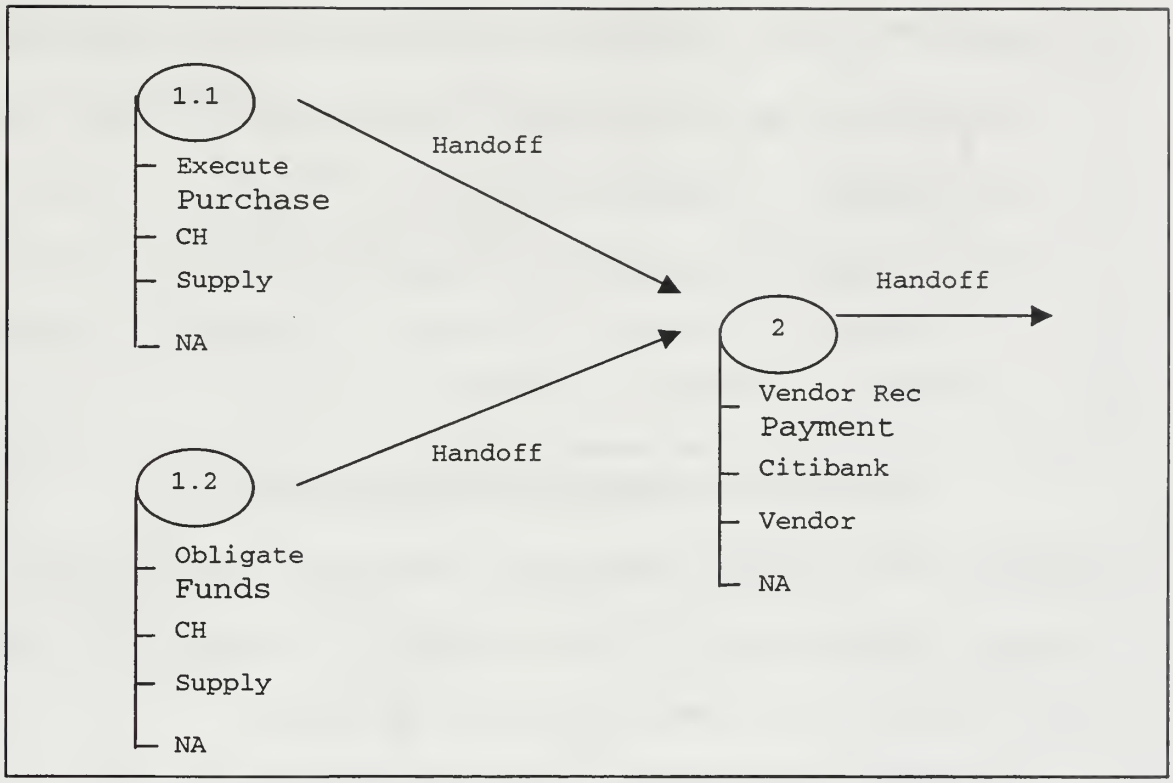

Figure 13. Obligation of Funds

The next phase in the credit card process is the receipt of supplies/services and occurs after the purchase request is handed off from the credit cardholder to the receiving section. This process is depicted in Figure 14. The receiving section uses the purchase request to ensure the unit receives all items purchased. The first task in this phase is the receipt of all supplies or services (node 1), after which an inspection is conducted (node 2), quantities verified (node 3) and the item is forwarded to the end user (node 4).

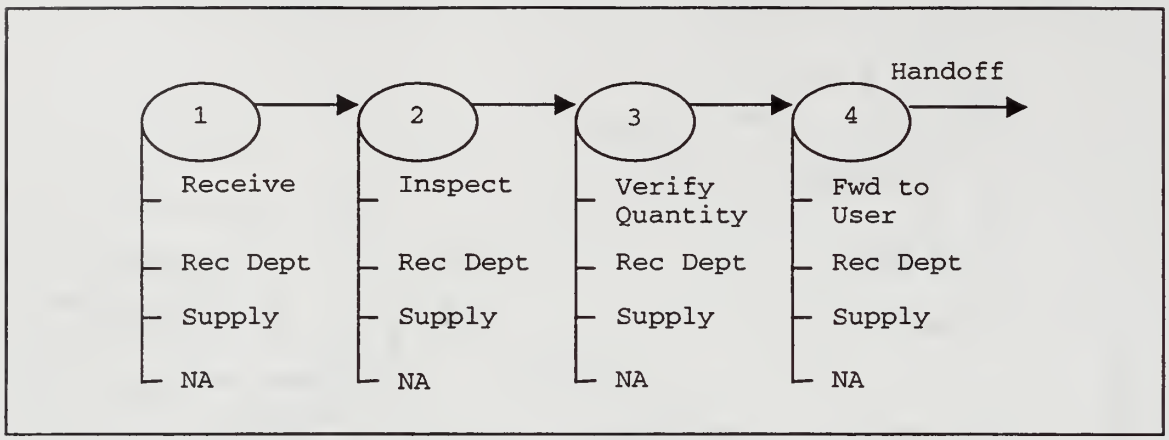

Figure 14. Receipt of Supplies/Services

Once all tasks in this phase are completed, the purchase request is handed off to the cardholder at which time the final phase of the credit card process begins.

The final phase of the credit card process is the reconciliation of statements. The flow of work in this phase of the process is depicted in Figure 15. This phase begins when the cardholder receives his monthly invoice from the credit card company. The cardholder's first duty is to verify all charges on the invoice (node 1) and attach supporting documentation (node 2). Once all supporting documentation is attached to the monthly statement, the cardholder forwards it to the approving official (node 3). Once the hand off is complete between the cardholder and approving official, the approving official, utilizing a feedback loop, reviews the statement and supporting documentation and verifies all charges are accurate. If

all supporting documentation is present and all charges are correct, the approving official (AO) signs the statement, stating all charges are correct (node 4). The statement is then forwarded to the Agency Program Coordinator (APC) in another hand off.

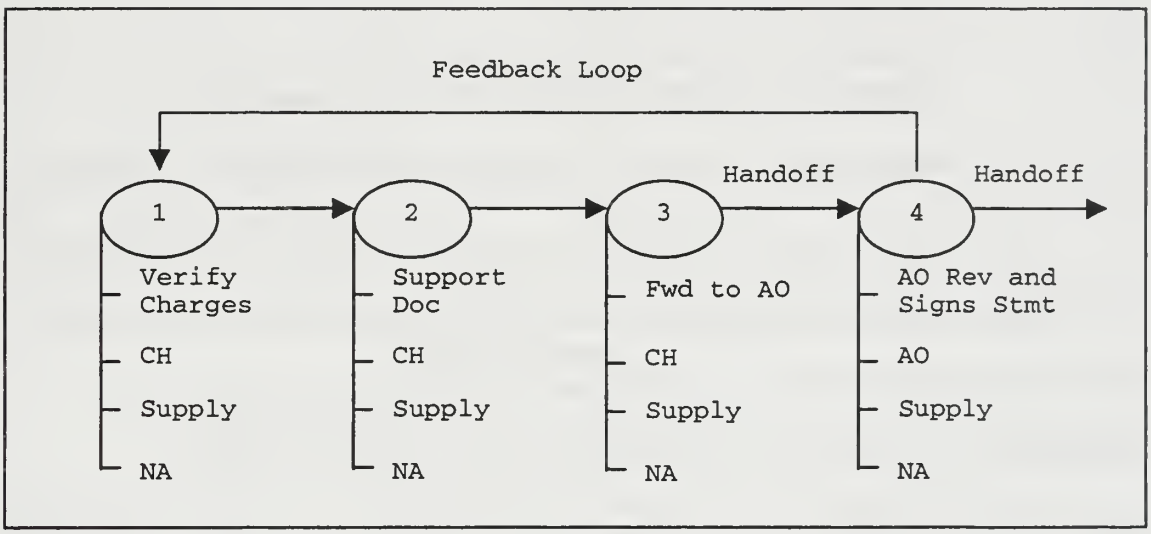

Figure 15. Reconciliation of Statement

The APC will collect all monthly statements for the cardholders assigned and, in a final hand off, forward the statements to DFAS for payment to the credit card company. The remaining tasks in the phase are depicted in Figure 16.

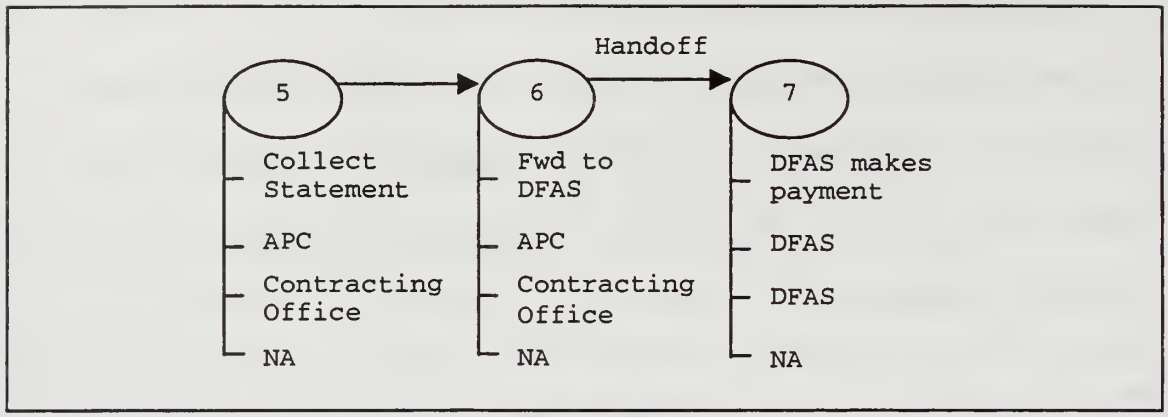

Figure 16. Reconciliation of Statement

2. Measurement of the Current DoD Credit Card Process

The next step in analyzing the DoD Credit Card Process is to input the process information into KOPeR and examine the recommendations it provides to develop alternative redesigns. During this stage of the KOPeR Redesign methodology, KOPeR is taking the process model as developed above and using measurements to detect the severe pathologies and faults associated with the process. [Ref. 12]

Measurement	Value
Process Size	31
Process Length	30
Handoffs	11
Feedback Loops	3
IT Support	0
IT Communication	0
IT Automation	0

Table 4. KOPeR Measurements of Current Credit Card Process

The KOPeR Redesign Agent asks for the information listed in Table 4 in order to measure and diagnose the process. Process size is the total number of activities (task nodes) to complete the project. In the credit card process, the process size is 31. Process length is the longest path of activity nodes to complete the project. In the credit card process, the process length is 30. Handoffs reflect the "number of inter-agent transfers of work". [Ref. 11] To determine this measurement, KOPeR counts the "number of traverses of process work across different agent roles, departments and organizations". [Ref. 11] The number of handoffs in the credit card process is 11. Feedback loops reflect the "number of

quality/feedback loops in a process". [Ref. 11] In the credit card process there are three feedback loops. The last measurements KOPeR examines address the amount of IT support, IT communication and IT automation in the process. Although a database can be used for funds verification (see Figure 9), a zero is entered for all three of these values since no formal IT use is incorporated into the credit card process.

Based on the measurements above, KOPeR's pathology diagnosis is:

- Parallelism (1.033) - sequential process.
- Handoffs Fraction (0.355) - process friction.
- Feedback Fraction (0.097) - feedback looks OK.
- IT Support Fraction (0.0) - inadequate IT support.
- IT Communication Fraction (0.0) - inadequate IT communications.
- IT Automation Fraction (0.0) - inadequate IT automation.

In essence the credit card process in its current form is a sequential process. This means the process can be streamlined if tasks, not mutually dependent, are performed concurrently, shortening the process length. Additionally, the process has a relatively high degree of friction due to

the number of handoffs between agents and organizations within the process. Finally, the process in its current form lacks any IT support, communication or automation.

To redesign the process, KOPeR recommends that the process be delinearized. Again, this entails identifying those tasks that are sequentially independent and executing them in parallel, shortening the process length. Additionally, KOPeR recommends the use of an integrated process team (IPT) or case manager to decrease the level of friction within the process. The IPT/case manager would serve as a source of expertise and eliminate the need for handoffs within the process. Finally, KOPeR found in its diagnosis that the credit card process lacks the use of IT. The use of IT support, such as decision support systems or intelligent systems can eliminate tasks in the process, which further streamlines the process. Additionally, the use of IT communications, such as, e-mail and shared databases can also expedite the process flow. Furthermore, the process, in its current form, lacks the use of IT to automate process activities. However a prerequisite of IT automation is the requirement of an IT infrastructure in terms of both process support and communication.

C. REDESIGN ALTERNATIVES

1. Alternative Redesign Processes for the DoD Purchase Card Program

KOPeR has provided a diagnosis of the faults within the credit card process and provided redesign transformations that are most likely to effect a dramatic improvement in the credit card process performance. The next step in the KOPeR Redesign Methodology is to take the transformations and apply them to the baseline process model to generate redesign alternatives for the credit card process. [Ref. 12]

CitiBank and the DoD Purchase Card Program Office have already begun to examine redesign alternatives. One of their redesign alternatives for the credit card process is outlined briefly here. However, this redesign process is not analyzed by the author, since the objective of this thesis is to evolve fresh redesign models, which add value to the DoD Credit Card Process.

Although some of the author's redesign alternatives incorporate the DoD Purchase Card Program Office's redesigned process, they go beyond the current vision, incorporating the recommendations of KOPeR to generate fresh processes for consideration. Specifically, three redesign alternatives are presented and discussed: 1)

workflow system, 2) information availability, and 3) web portal. Each redesign is discussed in turn.

a. Redesign Alternative Number I

The first alternative incorporates the use of a workflow system concept. Workflow systems are used to "support process activities through shared databases and networked communications, in addition to automatically routing work to the right agent(s) at the right time." [Ref. 11] Thus, the value of incorporating a workflow system into the DoD credit card process is that it automates the task of forwarding documents from one agent to the next. In the baseline process, an agent physically walks the purchase request from one desk to another. Through the use of a workflow system, the purchase request is transmitted electronically, streamlining the process and eliminating non-value added tasks. The concept of generating and completing the purchase request "on-line" parallels the vision of the Standard Procurement System now being employed in contracting offices throughout DoD.

The following paragraphs diagram and outline Redesign Alternative Process I and identify adaptations from the current DoD credit card process baseline. Only those steps deleted or modified from the baseline are discussed (shaded in gray).

The first stage of the credit card process affected by the implementation of a workflow system occurs during requirements generation. The workflow affected in the requirements generation for Redesign Alternative Process I is depicted in Figure 17.

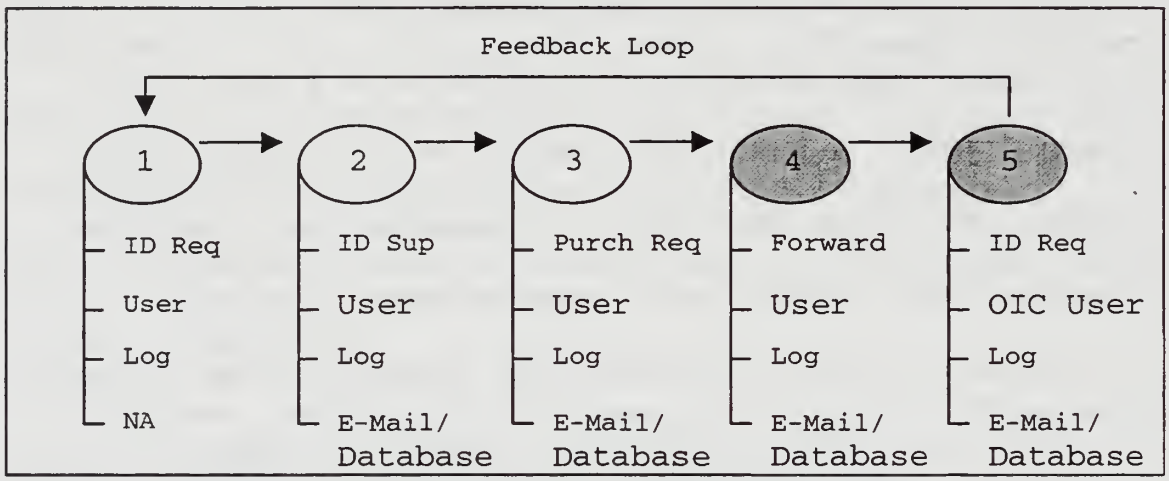

Figure 17. Requirements Generation for Redesign Alternative Process I

The workflow system modifies task numbers four and five of requirements generation. During task number four, the user forwards the purchase request to the OIC for review. Previously, the user physically walked the purchase request from his desk to the desk of the user. As proposed in Redesign Alternative Process I, the purchase request is completed "on-line" and generated from a shared database. Once completed, it is forwarded electronically to the OIC for review and appropriate action. Additionally, the OIC, once task number five is completed, can forward the purchase request electronically to the

cardholder in Supply, beginning the next stage of the credit card process.

The next stage of the credit card process affected by the implementation of a workflow system occurs during review of the purchase request. The workflow affected in the review of the purchase request for Redesign Alternative Process I is depicted in Figure 18.

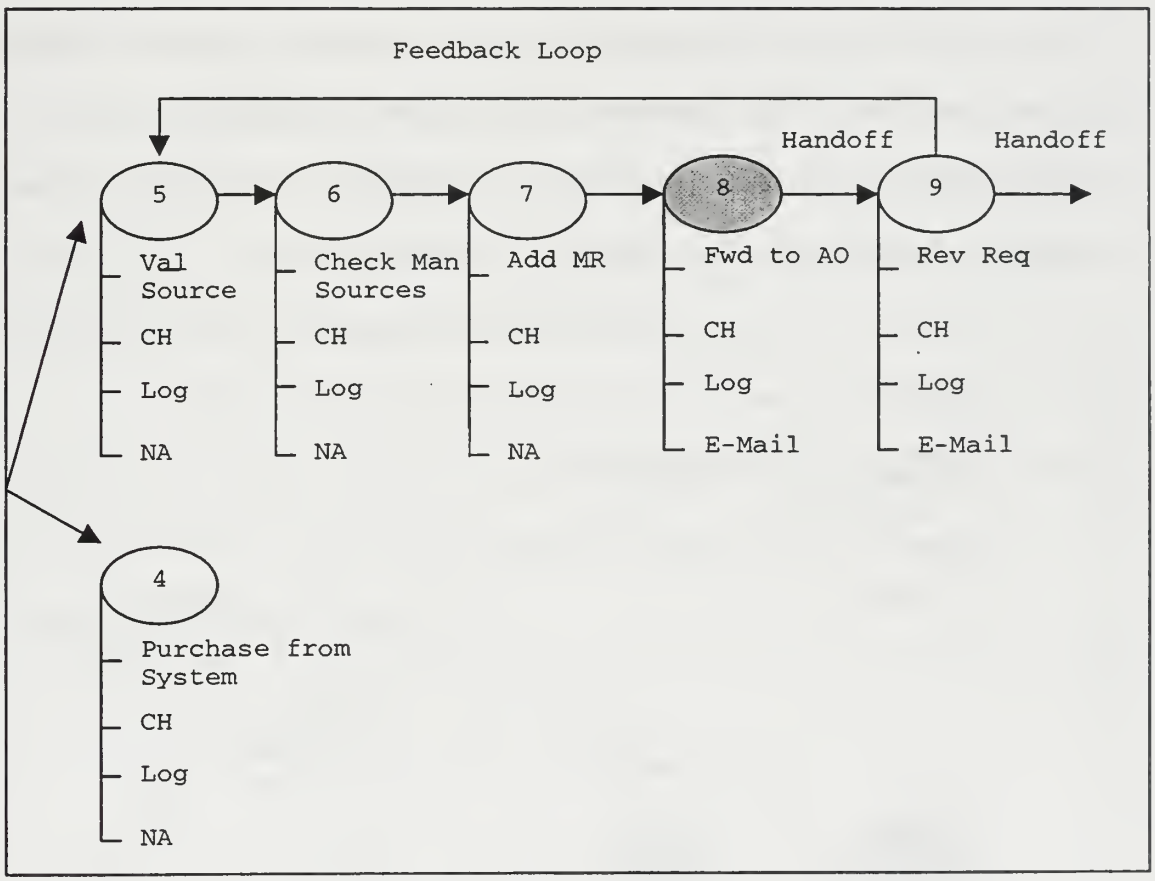

Figure 18. Review of Purchase Request

The workflow system modifies task number eight of the review of the purchase request. During task number eight, the cardholder forwards the purchase request to the approving official for approval. By using networked

communications and share databases, the purchase request is forwarded electronically, streamlining the process. Once the approving official approves the purchase request, he routes the purchase request back to the cardholder electronically eliminating unnecessary steps in the process.

The next stage of the credit card process affected by the implementation of a workflow system occurs during the hand off between stage five (obligation of funds) and stage six (receipt of supplies/services). The change in workflow is depicted in Figure 19.

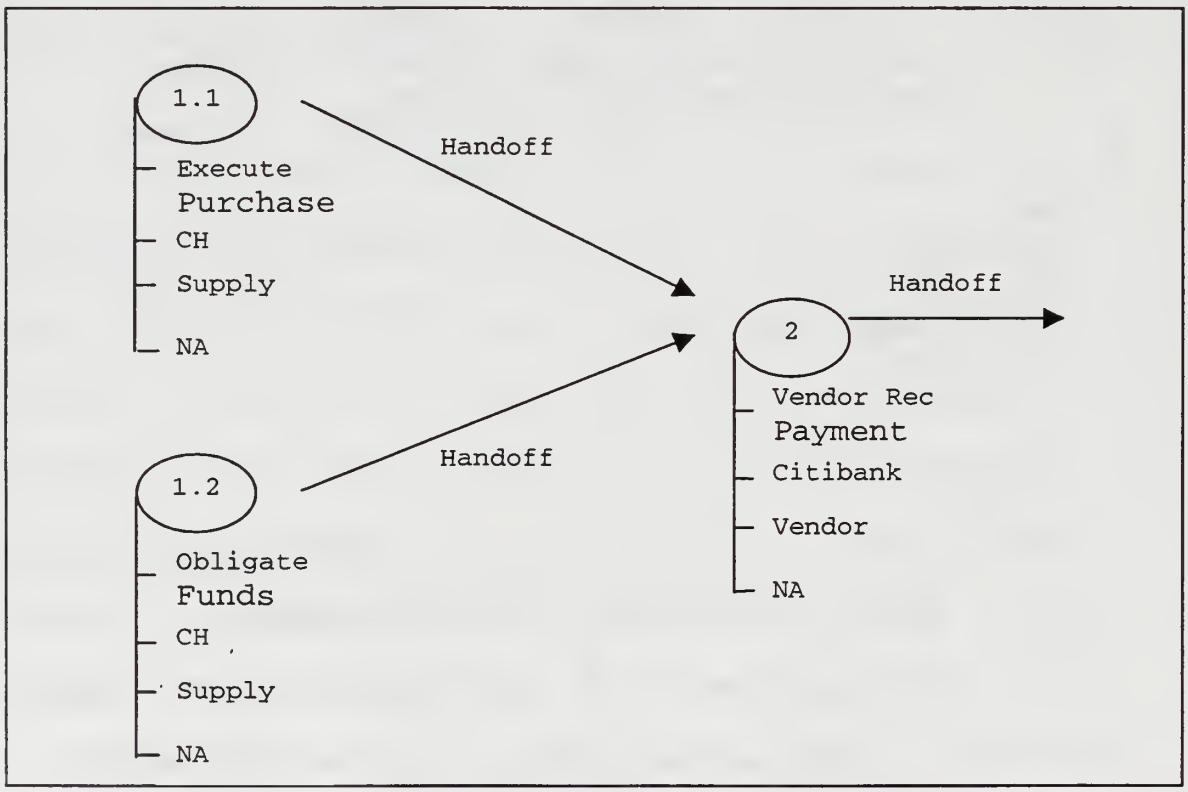

Figure 19. Obligation of Funds

Under the current process, the cardholder executes the purchase, and the purchase request is physically handed off to the receiving location to await receipt of the supplies and services. By employing a workflow system concept that focuses on the use of shared databases, the physical hand off (occurring after node 2) of the purchase request is eliminated. The receiving location does not need a paper copy of the purchase request. They can access the required information from the shared database, annotate any discrepancies in shipping, receipt for the equipment and notify the cardholder by e-mail that the shipment has arrived.

The final stage affected by the implementation of a workflow system occurs during stage seven, reconciliation of statements. The workflow affected in this stage is depicted in Figure 20.

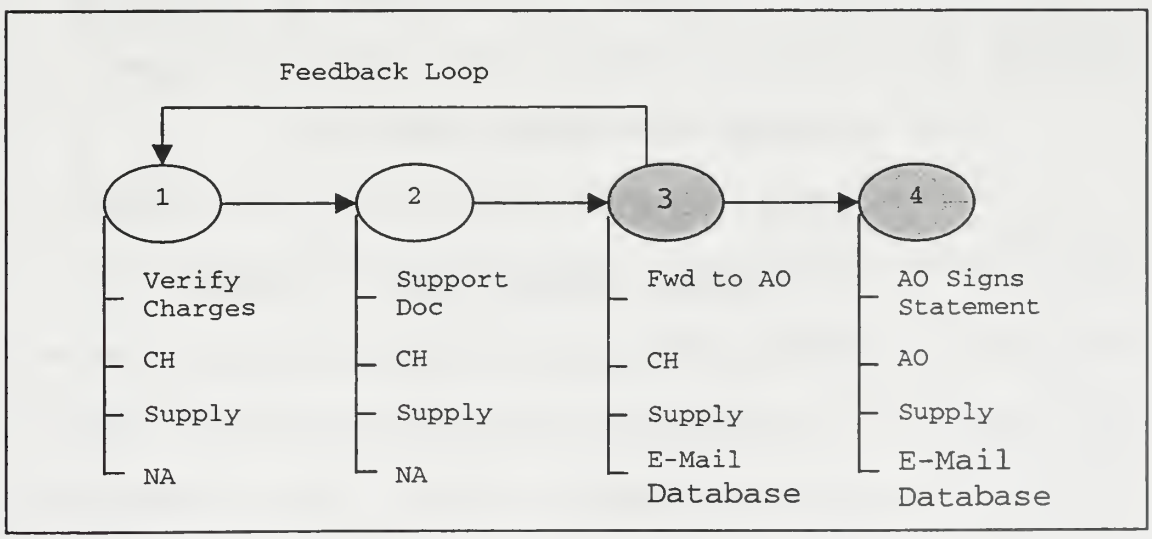

Figure 20. Reconciliation of Statement

The implementation of a workflow system also parallels the CitiBank and DoD Purchase Card Program Office vision for the immediate future. They are employing technology now that will send the cardholder his invoice on-line. The technology enables the cardholder to verify the invoice, forwarding it on to the approving official and finally DFAS for payment. By putting the purchase request on-line, the approving official has all required information at his finger tips during the reconciliation process to certify the invoice for payment. The value of this improvement is that it eliminates the requirement for the cardholder to gather all necessary documentation once an invoice arrives in the office, streamlining the process and providing the approving official with immediate access to all relevant information. The approving official can then electronically forward the statement to the agency program coordinator and then to DFAS for final payment.

b. Redesign Alternative Number II

The second alternative results from a change in information availability. Under this alternative, information regarding NSN availability is made available to the user during requirements generation instead of stage three, review of the purchase request. This alternative

also builds on the concepts laid out in redesign alternative number I by implementing IT in the process.

The following paragraphs diagram and outline Redesign Alternative Process II, identifying adaptations from the current DoD credit card process baseline. Again, only those steps deleted or modified from the baseline are discussed (shaded in gray).

The stages of the credit card process affected by changing the availability of information in the credit card process are requirements generation and review of the requisition. The workflow affected in the requirements generation under Redesign Alternative Process II is depicted in Figure 21.

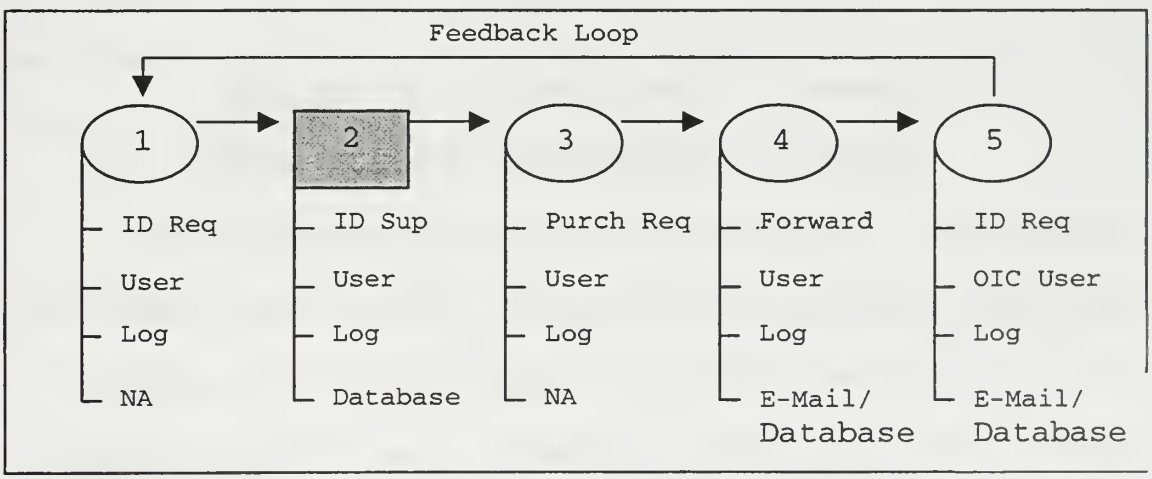

Figure 21. Requirements Generation

Using Redesign Alternative Process II, the user has information on NSN availability earlier in the process. He can now, during task two, make a more informed decision,

taking into account the length of time to delivery, cost, etc. The underlying sub tasks for task two are depicted in Figure 22.

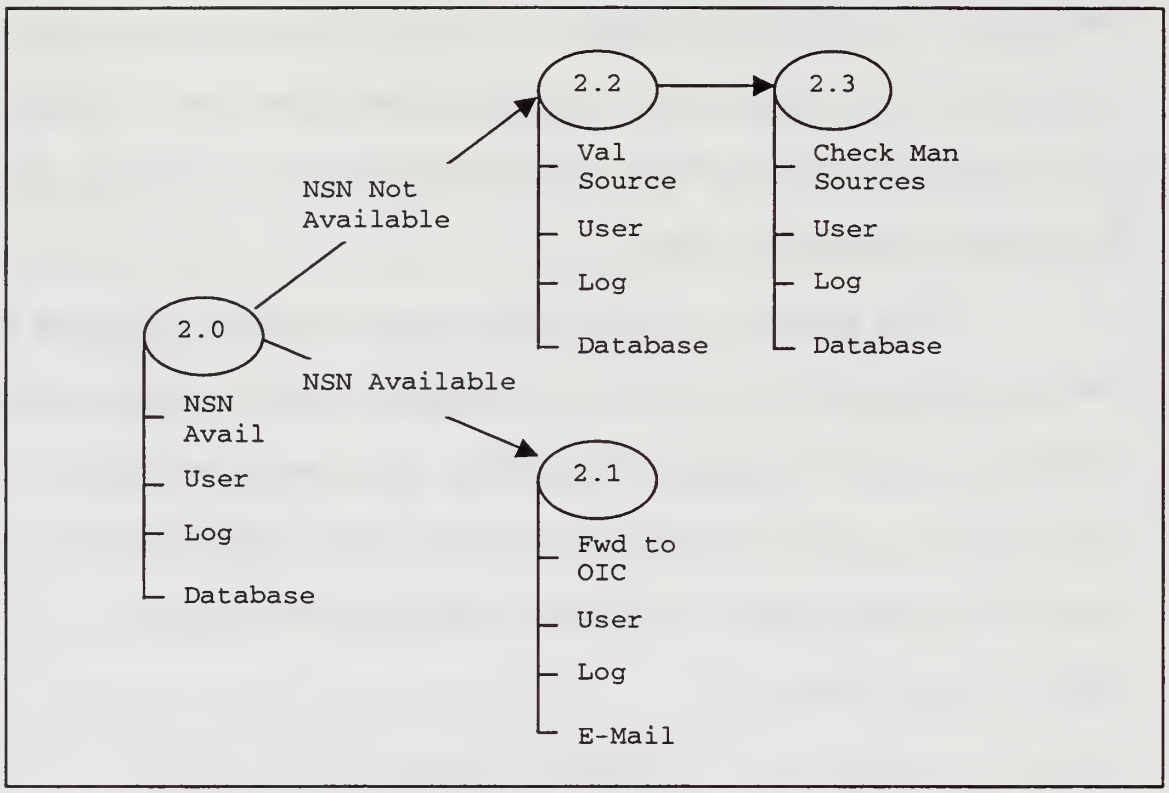

Figure 22. Identification of Supplier

Under this alternative redesign process, the user, once a requirement is identified, accesses the database containing the list of a NSNs to determine if one is available to satisfy his requirement. If an NSN is available in the supply system, the user identifies the appropriate information to execute the purchase in that manner. If an NSN is not available, the user identifies a recommended source of supply. In this redesign alternative, the user also accesses a database allowing him

to verify the items cannot be obtained from a mandatory source such as General Services Administration (GSA).

By executing these tasks earlier in the process, not only are both the user and OIC better informed of the acquisition process and the length of time to fill the requirement, but it eliminates tasks later in stage three of the credit card process. The workflow affected in the review of the purchase request for Redesign Alternative Process II is depicted in Figure 23.

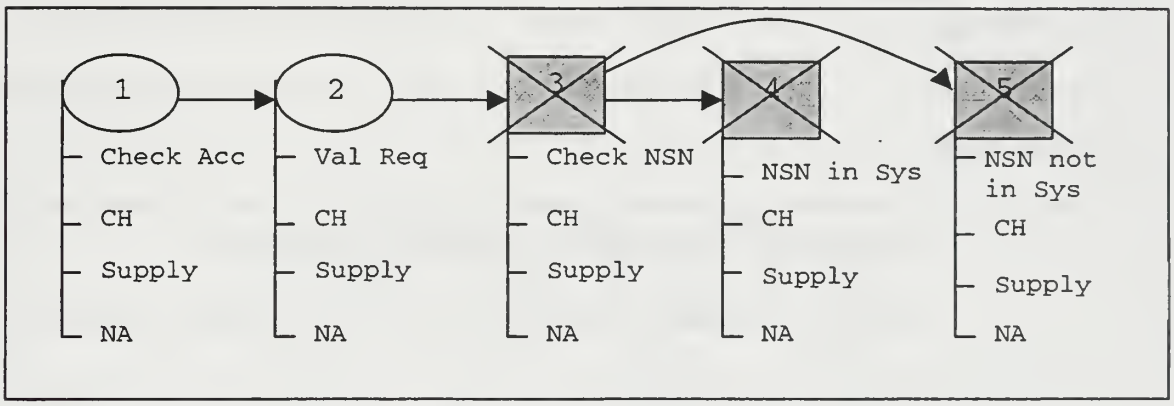

Figure 23. Review of Purchase Request

Because information is made available earlier in the process, tasks three through five are eliminated from this stage, now being executed by the user during requirements generation. Additional tasks are also eliminated in the second half of stage three. The workflow affected in this stage for Redesign Alternative Process II is depicted in Figure 24.

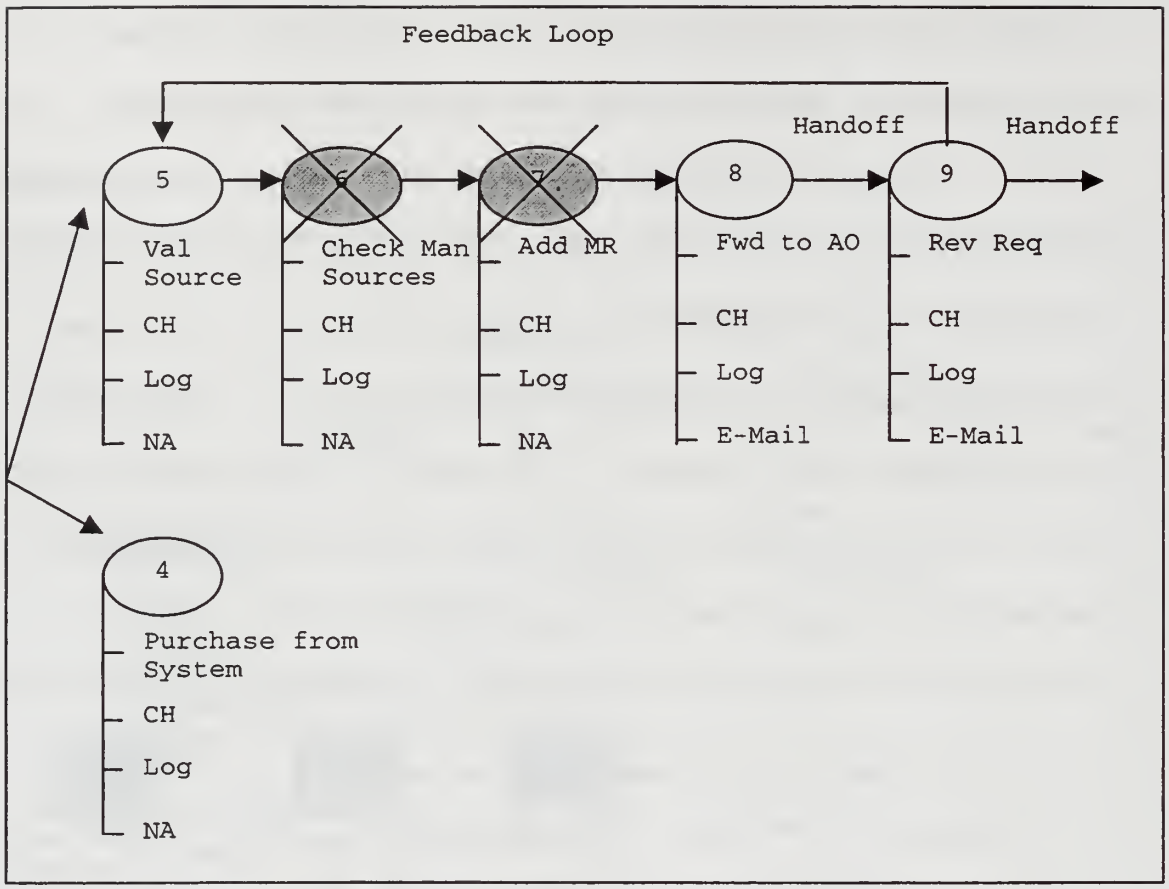

Figure 24. Review of Purchase Request

Again, because information is available earlier in the process, this results in the elimination of tasks later in the process. Thus, the cardholder does not verify mandatory sources or conduct additional market research in this stage.

c. Redesign Alternative Number III

The redesign alternative CitiBank and the DoD Purchase Card Program Office are formulating is the development of a Web-Based Portal design for use by the credit card user. Briefly, a web-based portal is a web site where, once accessed, an individual can navigate through

the internet without leaving the portal web site. For example, www.amazon.com contains a portal called Z-Shops. At the Z-Shops web site, an individual can shop for a wide range on items, from clothing to electronics. When the individual selects an item to purchase (e.g., Tech Jacket Royal Blue Adult XL), the portal connects to the company selling the item (e.g., Design Options, Carson City, NV) and retrieves the item's listing for view on the Z-Shops web site. The individual has the option to purchase the item without ever leaving the Z-Shops web site. Figure 25 provides an overview of this process.

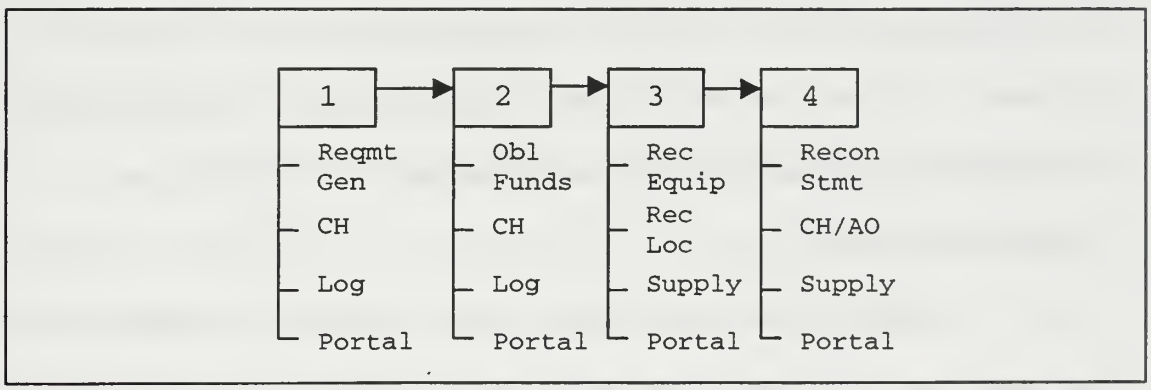

Figure 25. CitiBank and the DoD Purchase Card Program Office's revised Credit Card Process Using a Web-Based Portal System

By using a portal design, the credit cardholder accesses a specific web site to make his purchase. This web site serves as the cardholder's "port hole" into the web. At the web site the cardholder performs all tasks, from market research to the execution of the purchase. The value of

this design is that the web site functions as an expert system, incorporating all the regulations and statutes pertaining to the simplified acquisition procedures, thus, eliminating the requirement for the cardholder to have simplified acquisition training.

Redesign Alternative Process III builds on the CitiBank and the DoD Purchase Card Program Office option of a Web-Based Portal System, by incorporating the concepts of end user empowerment and the case manager. This alternative also builds on the concepts laid out in redesign alternative numbers I and II by implementing IT in the process and providing information earlier in the process. Hence, it is assumed that process changes from alternatives I and II are incorporated in this final redesign process.

The objective of this alternative is empowering the end user, making him the "case manager" for the entire requisitioning process. Since the web-based portal system encompasses an expert system governed by the simplified acquisition procedures, the end user (e.g., the Lance Corporal who has a requirement for a new engine part for a vehicle in the motor transport section) is now empowered to execute the entire requisitioning process. Additionally, instead of having the supplies delivered to Supply to be

"received" and then "forwarded" to the end user, the shipment goes directly to the end user.

One of DoD's initiatives with the new credit card program is to ensure the Government does not incur penalties for late payments. Thus, the new policy is to pay the credit card invoice in full even if a shipment has not arrived. If a discrepancy does exist, the disparity can be addressed with the vendor directly and, if required, an adjustment can be made to the invoice at that time. Therefore, in keeping with the policy, why do we need to ship supplies or services to the supply section to be "received"? The receiving procedures can be executed by the cardholder, streamlining the process.

The following paragraphs diagram and outline Redesign Alternative Process III, identifying adaptations from the current DoD credit card process baseline. Again, only those steps deleted or modified from the baseline are discussed (shaded in gray).

The first stage of the credit card process affected by employing a Web-Based Portal System, empowering the end user and using a case manager concept is requirements generation. The workflow affected in the requirements generation for Redesign Alternative Process III is depicted in Figure 26.

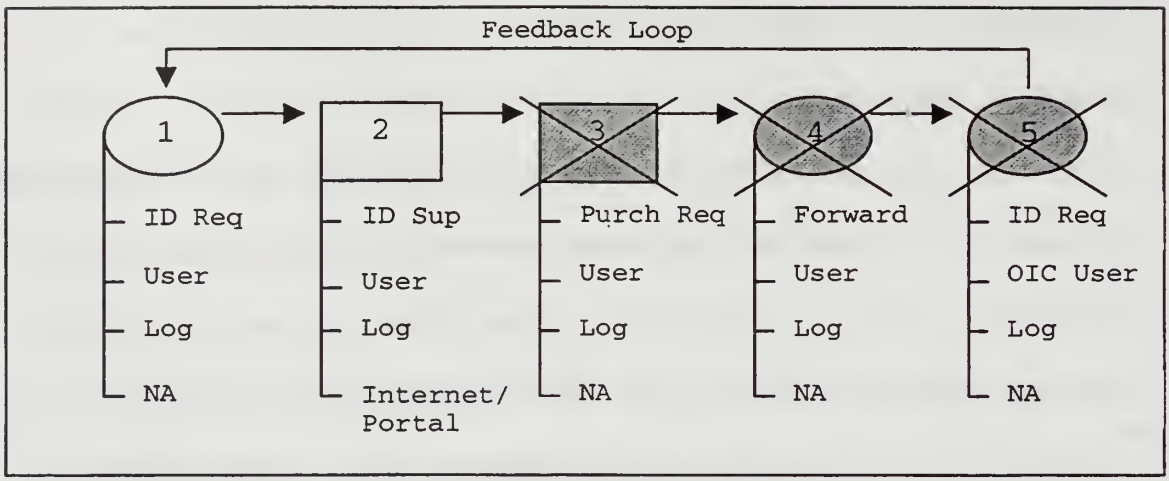

Figure 26. Requirements Generation

The employment of a web-based portal system eliminates tasks three through five and streamlines the subtasks under supplier identification.

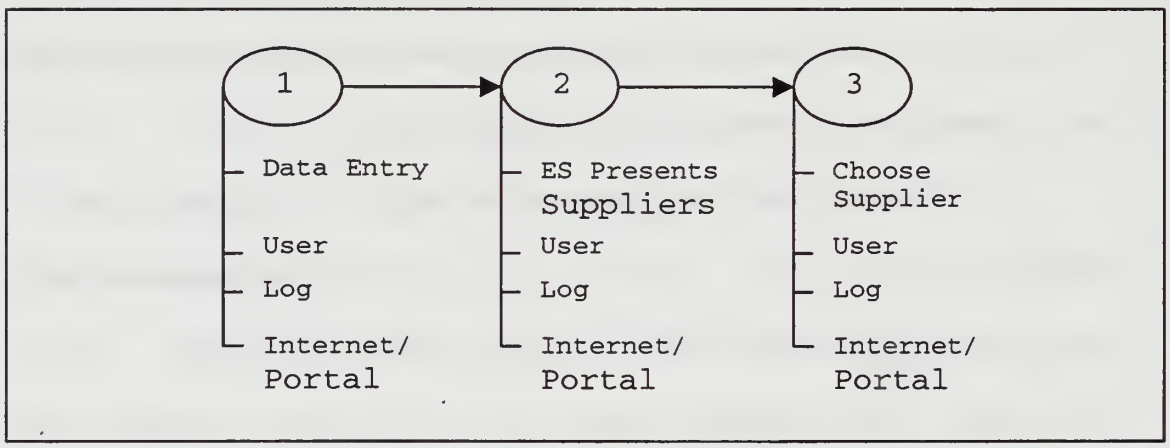

Figure 27. Subtasks for Supplier Identification

Utilizing this redesign alternative process, the user, once a requirement is identified, immediately accesses a web-site portal. At the web-site, the user enters the description of the item, urgency designator, and quantity required. He also chooses from a predetermined list of accounting data to charge the supplies against.

Once all information has been entered on the data entry screen, the user sends the transaction into the Internet and expert system.

The expert system first determines if an NSN is available. If an NSN is not available, the expert system and Internet, utilizing the regulations and statutes for the Simplified Acquisition Procedures, determines the appropriate list of suppliers, identifying item, cost (including shipping charges) and estimated delivery time. Once the expert system accomplishes these tasks, it presents the list of suppliers to the user and, in addition, provides the user's current account balance. The user can now select, from the list of suppliers, the item which best suits his needs based on cost and other related factors.

When the user selects the supplier and enters in his credit card number, the requisition is automatically sent to the vendor obligating the funds. In addition, the expert system also provides an adjusted account balance based on the current transaction. These steps eliminate stages two (verification of funds) through five (obligation of funds) in the credit card process.

Once the vendor receives and fills the requisition, the supplies will be shipped directly to the

user. Upon receipt, the user accesses the web-site, containing a record of his transaction, and completes the steps of receiving, verifying and inspecting the shipment at his location. Once the user receives the shipment, he enters the receiving information in the record stored on the web-site. Once the information is entered in the web-site, a notification of receipt is sent by e-mail to Supply, informing them of the receipt of equipment. This enables Supply to adjust the property records. By using this redesign alternative process, the user now completes all tasks in the stage of receipt of supplies/services.

D. SUMMARY

KOPeR's analysis of the credit card process has shown that the process is in need of both streamlining and introduction of IT. Three alternative redesign processes are developed on a continuum of the level of IT development. The first incorporates the use of workflow systems and introduces IT into the process. This alternative can be implemented now, since DoD already possesses the infrastructure for both databases and e-mail. The second redesign alternative adjusts the availability of information, providing access earlier in the process. This alternative requires the development of advanced databases providing the user access to NSN availability in an easy to

use format. The third and final redesign alternative incorporates the use of a web-based portal, empowering the user to execute the entire requisition. This alternative requires extensive development of a web-based portal system as well as the expert system that drives the control of the Simplified Acquisition Procedures.

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IV. ANALYSIS OF THE ALTERNATIVE REDESIGN PROCESSES

This chapter provides an analysis of the alternative redesign processes described in Chapter III to further analyze the potential for innovation of the credit card process. The chapter is divided into three parts. In each section, one of the proposed redesign alternatives is evaluated using the KOPeR methodology. Transformations are determined that are most likely to effect a dramatic improvement and identify strengths and weaknesses of each redesign alternative. Each section also analyzes the positive implications and potential inhibitors that determine the success or failure of the corresponding redesign process. Each potential inhibitor is addressed to provide a complete analysis of the challenges required to implement the corresponding redesign alternative.

A. REDESIGN ALTERNATIVE NUMBER I

Recall the first redesign alternative incorporates the use of workflow systems and introduces IT into the credit card process as discussed in Chapter III. The first step in analyzing this alternative redesign process is to evaluate the process in terms of the measurements used in the KOPeR Methodology. The measurements obtained for this first redesign process are listed in Table 5. For

reference, values presented above for the baseline process are also listed to enhance comparison.

Measurement	Baseline	Redesign I
Process Size	31	31
Process Length	30	30
Handoffs	11	11
Feedback Loops	3	3
IT Support	0	4
IT Communication	0	11
IT Automation	0	0

Table 5. KOPeR Measurements of Redesign Alternative Process I

Notice the key changes in measured values for IT Support and IT Communication. By introducing the use of shared databases to support the process, agents can access information stored in the system rather than filing cabinets located in only one area. For example, the purchase request is filled out online and forwarded from one agent to another electronically. Thus, agents in the process can access specific pieces of information vital to their tasks at any time, eliminating the need for phone calls or physical contact with other agents in the process. The introduction of shared databases to support the process

allows four tasks in the process to be supported by IT, up from zero in the baseline process.

By introducing the formal use of e-mail as the tool for forwarding the purchase request from agent to agent, it eliminates the need to physically walk the purchase request from desk to desk. This simple introduction of e-mail allows 11 tasks to be identified as IT communication compared with zero in the baseline process.

Some would consider the number of tasks aided by IT communication and support to appear low for Redesign I, since the basis of a workflow systems design is to fully employ IT to support and communicate in the process. In some instances, the introduction of workflow system designs allows for all tasks in the process to benefit from IT support and communication. Thus, the introduction of a workflow systems design could provide for nearly 100% of all tasks to employ some form of IT for communication and support.

However, upon review of the specific tasks in the credit card process, this general conclusion does not hold merit. Many of the tasks in the credit card process cannot increase their values due to the complexity of decisions made in each specific task. For example, in stage one, requirements generation, task two, identification of a

supplier, cannot be supported simply by the introduction of shared databases and e-mail. Execution of this task must be completed by an agent who can conduct market research through Internet searches and phone calls. This task could be supported by the implementation of expert systems and portals linking suppliers to Government Malls, however, the objective of Redesign I is to develop a redesigned process using today's technology that increases the efficiency of the process. Therefore, the increase in IT support and communication from zero to four and zero to 11, respectively, through the introduction of a workflow systems design, represents a significant increase for the credit card process.

Based on the measurements above, KOPeR's pathology diagnosis is:

- Parallelism (1.033) - sequential process.
- Handoffs Fraction (0.355) - process friction.
- Feedback Fraction (0.097) - feedback looks OK.
- IT Support Fraction (0.129) - inadequate IT support.
- IT Communication Fraction (0.355) - inadequate IT communications.
- IT Automation Fraction (0.0) - inadequate IT automation.

Notice Redesign I continues to suffer from several of the pathologies affecting the process baseline.

1. Positive Implications

Positive implications are factors in the application of the alternative redesign process that provide for increased efficiency and process performance. There are three positive implications for Redesign Alternative Process I, each of which is discussed below.

a. Technological Availability

The first positive implication for Redesign Alternative Process I is that it can be implemented now. DoD already possesses the IT infrastructure for both databases and e-mail. One of the recommendations of KOPeR for the current DoD Credit Card Process is to increase the IT support to communications within the process. Such changes include the use of e-mail and shared databases through local/wide area networks and have been found to have good payoffs expediting the process flow. [Ref. 11]

In Redesign Alternative Process I, a workflow system concept is utilized to attain this recommendation. Although KOPeR's pathology diagnosis states that Redesign Alternative Process I still has inadequate IT communication, this alternative can be implemented today, allowing the credit card process to take the first step

toward the goal of process innovation until more advanced technology is developed.

b. Reduced Cycle Time

The second positive implication of Redesign Alternative Process I is that the implementation of this redesign alternative should lead to a reduction in cycle time. By implementing the use of a workflow concept, employees now electronically forward purchase requests to other agents in the process, instead of taking time out of their day to physically walk the requests from office to office. This allows the employees to make more efficient use of their time and does not require the employee to stop all work to execute the forwarding task in this process.

Additionally, by using e-mail or a shared database in this alternative, all the agents involved in this process are assured that purchase requests are not lost in agents' desks or between agents in the process. Hence, this leads to a reduction in cycle time for the credit card process and makes all agents in the process more efficient. Further, agents can access purchase requests at any time in the process, avoiding the need for close coordination among or proximity between agents to gain physical access to purchase requests.

c. Minimal User Impact

The third positive implication of Redesign Alternative Process I is the impact to the user is expected to be minimal. DoD already uses e-mail and shared databases to increase the efficiency of communication between employees. The implementation of this alternative would formalize the use of IT communication in the exchange of work documents for the credit card process. Thus, the impact to the user of the credit card process is minimal and, at most, only requires agents to be trained on how the credit card process is affected by the implementation of Redesign Alternative Process I.

2. Potential Inhibitors

Potential inhibitors in the application of the alternative redesign process are factors that repress, discourage or reduce the potential gain from this process innovation. Two potential inhibitors to Redesign Alternative Process I are noted: 1) the requirement to train agents within the credit card process (e.g., allowing them a period of time to become proficient in the use of IT communication for the credit card process), and 2) the requirement for maintenance of computer hardware and software.

Regarding the first inhibitor, training is required whenever a new technology or process step is introduced and it takes time for employees to shift from one technology and process design to another. Regarding the second, maintenance of computer hardware and software becomes a vital part of a technology enabled process. When a process becomes dependent on the use of IT for support and communication, maintenance represents a critical activity. For instance, if computer hardware or software malfunctions, it could impede or virtually stop the process.

3. Addressing the Inhibitors

The need for agents to be trained in the credit card process has little, if any, effect on the implementation of this redesign alternative. For example, the Marine Corps has used Lotus Smartsuite and some form of e-mail system (e.g., Banyan Vines, Notes) since the early 90s. Additionally, the exponential growth in the IT Industry has led to significant reductions in the cost of personal computers for use within the home. Hence, most DoD employees should have some degree of experience with e-mail and shared databases. Because of this, the degree of training should be minimal, and this redesign may only

require a simple set of procedures on how to forward information through the credit card process.

The need for maintenance of computer hardware and software is similar to the requirement for training and should have minimal impact in this redesign alternative. DoD already uses many programs and systems that depend on computers and computer software. Additionally, the use of e-mail and shared databases is not by any means new technology. DoD currently trains, or has industry train, individuals in each unit to maintain and trouble shoot these programs and other IT systems. These individuals are also tasked with learning new software that could be used to increase the efficiency of DoD employees and DoD processes. Hence, the implementation of this redesign alternative would only result in an improvement to the DoD credit card process without adversely impacting others in the process since the task of maintenance is already being accomplished.

B. REDESIGN ALTERNATIVE NUMBER II

The second redesign alternative incorporates the practice of furnishing information to the user in the beginning of the process. Again, the first step in analyzing this alternative redesign process is to evaluate the process in terms of the measurements used in the KOPeR

Methodology. The measurements obtained for the second redesign alternative are listed in Table 6. For reference, values presented above for the baseline process are also listed to enhance comparison.

Measurement	Baseline	Redesign II
Process Size	31	31
Process Length	30	30
Handoffs	11	11
Feedback Loops	3	3
IT Support	0	6
IT Communication	0	11
IT Automation	0	0

Table 6. KOPeR Measurements of Alternative Redesign Process II

Notice the key changes in measured values for both IT support and communication. By providing the user with a tool (e.g., databases to determine the availability of NSNs in the supply system) during requirements generation, agents have access to information earlier in the process to make decisions mitigating the risk of equipment being unusable while awaiting delivery of parts. Additionally, by moving this section of tasks from stage three (review of purchase request), the credit cardholder has more time

available to service other purchase requests in the system, eliminating backlog and improving the credit cardholder's efficiency. The provision of providing the user with information earlier in the process, together with the introduction of e-mail from Redesign I, increases the tasks supported by IT to six compared with zero in the baseline process.

Based on the measurements above, KOPeR's pathology diagnosis for Redesign II is:

- Parallelism (1.033) - sequential process.
- Handoffs Fraction (0.355) - process friction.
- Feedback Fraction (0.097) - feedback looks OK.
- IT Support Fraction (0.194) - inadequate IT support.
- IT Communication Fraction (0.355) - inadequate IT communications.
- IT Automation Fraction (0.0) - inadequate IT automation.

Notice Redesign II continues to suffer from several of the pathologies affecting both the baseline process and Redesign I.

1. Positive Implications

The positive implications for Redesign Alternative Process II are that the user is better informed during the

acquisition process. Additionally, he has a better understanding of how long it takes to fill his requirement. Furthermore, the workload of the cardholder is reduced, which frees up the credit cardholder's time, allowing him to focus on tasks, which should result in faster execution of other purchase requests. Each of these positive implications is discussed below.

a. User is Better Informed

The first positive implication for Redesign Alternative Process II is that the user is better informed during the acquisition process. One of the recommendations made by KOPeR for both the baseline process and Redesign Alternative Process I is to increase IT support. Such changes include the use of decision support systems, desktop office tools, and intelligent systems, which generally have good payoffs and greatly enhance the knowledge of the agent. [Ref. 11] To attain this recommendation in Redesign II, the user accesses a database, similar to a decision support system that provides him with information concerning NSN availability during stage one, requirements generation. Although KOPeR's pathology diagnosis of Redesign Alternative Process II states that the process still has inadequate IT support, the implementation of the alternative redesign process

makes the user better informed of the acquisition process by providing information up front. Thus, the user can make adjustments to the purchase request based on the estimated times of delivery and take steps necessary to mitigate risk of a requirement not being filled for an extensive period of time.

b. Cardholder's Workload is Reduced

The second positive implication is that the workload of the cardholder is reduced. In Redesign Alternative Process II, the tasks of verifying the availability of an NSN in the supply system, validating the source of supply, and checking mandatory sources are completed by the user during requirements generation. Consequently, the cardholder's tasks during the review of the purchase request are streamlined. Hence, the cardholder's workload is reduced and he can now focus on checking the accuracy of the purchase request and, most importantly, he should have additional time to conduct market research, ensuring the Government receives the best value for the items or services requested. Furthermore, the cardholder should have more time to execute other purchase requests that may already be in the credit card process, reducing any potential backlog of work.

2. Potential Inhibitors

Four potential inhibitors in the application of Redesign Alternative Process II are noted: 1) the databases/decision support systems have not been developed, 2) continual updating of the databases, 3) training, and 4) maintenance of computer hardware and software. Regarding the first inhibitor, the decision support systems that the user would require during stage 1, requirements generation, to determine NSN availability have not yet been developed. This will delay the implementation of this redesign alternative.

Regarding the second inhibitor, the databases the user depends on, to determine the NSN availability in the supply system and product availability through mandatory sources, must remain current and accurate to ensure the purchase request is filled in accordance with the FAR. A mistake due to inaccurate information this early in the process could not only result in the requisition being filled by an inappropriate supplier, but could result in the Government paying a higher price for a the same item on a supply schedule.

Regarding the third inhibitor, as stated above, training remains a vital part of the implementation of IT into this process. The introduction of a new technology in

a process step must allow employees to become proficient with the new technology as they shift from one technology to the next. The fourth inhibitor is also discussed in Redesign I, as maintenance of computer hardware and software remains a vital part of maintaining the process to ensure the process operates smoothly.

3. Addressing the Inhibitors

Databases and decision support systems required to implement this system have not yet been developed. This represents the strongest of all inhibitors to the implementation of this process. The development of these databases and decision support systems requires extensive knowledge of the credit card process and the simplified acquisition procedures, as well as the ability to link mandatory sources to the system. Implementation of this process also requires cooperation from mandatory sources, such as GSA, to link their information systems to the database/decision support system developed for this alternative redesign process.

The second potential inhibitor to Redesign Alternative Process II is the requirement for continuous updating of databases. Because the user conducts a large portion of his market research (e.g., validating NSN availability and checking mandatory sources) through these databases, the

databases must be continually kept up to date. The databases must incorporate all changes in the simplified acquisitions procedures affecting mandatory sources as well as changes affecting NSN availability in the supply system. The databases and decision support systems must be linked to both the supply system to obtain NSN availability and to mandatory sources to ensure users are provided with the most current, up to date information.

The third potential inhibitor (training) and fourth potential inhibitor (maintenance of computer hardware and software) are discussed in the previous redesign alternative, and the conclusions remain consistent for this process.

C. REDESIGN ALTERNATIVE NUMBER III

Alternative redesign process III incorporates the development of a Web-Based Portal design for use by the credit card user in the credit card process. Again, the first step in analyzing this alternative redesign process is to evaluate the process in terms of the measurements used in the KOPeR Methodology. The measurements obtained for this final redesign process are listed in Table 7. For reference, values presented for the baseline Process are also listed to enhance comparison.

Measurement	Baseline	Redesign III
Process Size	31	25
Process Length	30	24
Handoffs	11	5
Feedback Loops	3	1
IT Support	0	6
IT Communication	0	5
IT Automation	0	8

Table 7. KOPeR Measurements of Alternative Redesign Process III

Notice the key changes in all measured values. By using a web-based portal and expert system, eight of the tasks in the process become fully automated. Due to the increased number of tasks automated, the total number of tasks in the process is reduced from 31 to 25. Additionally, by giving the user the tools and credit card to execute purchase requests, stage three, review of the purchase request, is eliminated, which reduces the number of feedback loops from three to one and the number of handoffs from 11 to five.

Based on the measurements above, KOPeR's pathology diagnosis for Redesign III is:

- Parallelism (1.042) - sequential process.

- Handoffs Fraction (0.2) - handoffs look OK.
- Feedback Fraction (0.04) - feedback looks OK.
- IT Support Fraction (0.24) - inadequate IT support.
- IT Communication Fraction (0.2) - inadequate IT Communications.
- IT Automation Fraction (0.32) - IT automation looks OK.

1. Positive Implications

The positive implications for Redesign Alternative Process III are a significant reduction in process friction, significant increase in process automation, empowerment of the user and increased IT support and communication in the process. Although still considered inadequate, KOPeR considers values of .5 or greater to be acceptable for both IT support and communication for a process such as this. Both IT support and communication now approach this threshold. Each of these positive implications is discussed in detail below.

a. Reduction in Process Friction

The first positive implication of Redesign Alternative Process III is a significant reduction in process friction. KOPeR recommended in its diagnosis of Redesign Alternative II that a case manager be employed to

reduce the amount of friction in the process. The case manager transformation involves replacing specialized employees in a process (e.g., the user, credit cardholder and approving official in the baseline process) with a generalist who performs all process activities, cradle to grave. [Ref. 11] In Redesign Alternative Process III, the case manager is the user. With the assistance of the expert system, the user is empowered, once a requirement is generated, to execute all tasks to purchase the items or services. Hence, the case manager concept has a positive effect on reducing cycle time in the credit card process by eliminating the need for handoffs and inter-departmental coordination. This is indicated in KOPeR's diagnosis of Redesign III, as the value for handoffs drops from .355 to .2, depicting a significant reduction in process friction.

b. Increase in the Automation of the Process

The second positive implication is the increase in the automation of the process. In Redesign Alternative Process II, one of the recommendations made by KOPeR is to automate process activities, particularly in terms of process communication and automation. KOPeR suggested the use of intelligent agents "which can enable many electronic commerce opportunities". [Ref. 11] Intelligent agents are software entities that assist people and act on their

behalf. They act like a private secretary, assistant or personal advisor who understands your requirements and anticipates what those needs are in advance. [Ref. 5] In Redesign Alternative Process III, using a Web-Based Portal design that incorporates an intelligent agent/expert system allows the user to have a full time personal advisor to assist him in navigating through both the simplified acquisition procedures and selection of a source of supply. Thus, the automation of tasks within this redesign alternative streamlines the process, further reducing process friction.

c. Empowerment of the User

Another positive implication is empowerment of the user. As discussed in the preceding paragraph, the user is the case manager. Redesign Alternative Process III empowers the user by delegating responsibility to ensure the quality of his own work. By empowering the user, he controls his own destiny. He now determines, on his own, what supplier fills the purchase request, what the terms of delivery are, and what he considers the best value for the Government. Who better to make these decisions than the user of the supplies or services?

d. Increased IT Support and Communications

Finally, the increased focus on IT support and communication in the process, although considered marginally inadequate by KOPeR, represents a positive implication of Redesign Alternative Process III. Again, this positive implication is not discussed for Redesign III since the corresponding analysis is presented above for the previous redesign alternatives, and the conclusions remain consistent for this process.

2. Potential Inhibitors

Four potential inhibitors for Redesign Alternative Process III are noted: 1) the expert system has not been developed, 2) continuous updating of the expert system, 3) training, and 4) maintenance of computer hardware and software. Regarding the first inhibitor, the development of the web-based portal and expert system impedes the implementation of this redesign as an immediate solution for the credit card process.

Regarding the second inhibitor, the continual updating of the expert system and web-based portal is required, because the user conducts all of his market research through this intelligent agent. Because of the ever-changing market place, links to companies and products must

be continually updated to ensure the Government receives the highest valued products.

Regarding the third inhibitor, as above, training remains a vital part of the implementation of IT in this process, since employees are shifting from a baseline process that does not utilize IT to a process focuses heavily on IT. Regarding the last inhibitor, as discussed in previous Redesign alternatives, maintenance of computer hardware and software remains a vital part of maintaining the process to ensure the process operates smoothly. This is particularly important for the implementation of Redesign III, due to the fact that so many of the tasks are dependent on IT. The interruption of IT in any task within the process would lead to immediate disruption of the process and inability of users to field their requirements.

3. Addressing the Inhibitors

The first potential inhibitor of Redesign Alternative Process III is the development of the expert system required to operate the system. As above, development of the expert system represents the strongest of all inhibitors against the implementation of this process. The development of the expert system will require extensive knowledge of the credit card process and the simplified acquisition procedures. The maturation of the web-based

portal to connect the user to sources of supply through the Internet requires extensive coordination of the commercial sector to identify markets and products to be listed on the portal.

The second potential inhibitor is the requirement for continuous updating of the expert system's databases as well as maintaining current links within the web-based portal. Because the user conducts the majority, if not all, of his market research through the web-based portal, the expert system and portal must be continually updated as changes occur in simplified acquisition procedures. Additionally, because the user relies completely on the expert system and web-based portal for market research, businesses that do not have their products listed on an IT system and linked to the web-based portal could be excluded from the Government market. Thus, those businesses excluded could protest, posing an additional threat and cost to the Government. To mitigate this risk, if this redesign alternative is implemented, the web-based portal must invite new businesses to build links on the Government's portal to advertise its products.

The third potential inhibitor of Redesign Alternative Process III is training of agents in the credit card system. If this alternative redesign process is

implemented, it increases the need for individuals to be trained in simplified acquisition procedures for the DoD Purchase Card. The reason for the increased requirement for training is, more employees will have credit cards at their disposal. Thus, employees must understand the regulations governing the credit card to ensure occurrences of misuse do not occur. However, since DoD has already developed an interactive CD-ROM to train individuals in credit card procedures, this potential inhibitor has minimal impact on the implementation of this alternative.

Finally, the fourth potential inhibitor of this redesign alternative is maintenance of the computer hardware and software required to operate the system. Again, as described in both redesign alternatives above, the fourth potential inhibitor (maintenance of computers and software) is identified in the previous redesign alternatives, and the conclusions remain consistent for this process.

D. SUMMARY

Davenport's analysis of the redesign alternatives for the credit card process provides positive implications of each alternative and addresses the potential inhibitors. By projecting and analyzing each critical performance characteristic of the alternative redesign processes

against the baseline, KOPeR reduces the inherent risks of reengineering the credit card process before committing time and money to a problematic implementation.

KOPeR's evaluation of the three redesign alternatives found that a continuum exists between the three redesign alternatives. This continuum begins with the use of technology that exists today and extends to developing an alternative which requires technology that may not be developed and ready for implementation for a number of years.

In Redesign Alternative Process I, the analysis shows that the positive implications appear more significant than the potential implications, supporting the fact that the implementation of the redesigned process is ready today. In Redesign Alternative Process II, the analysis shows the technology to implement the redesigned process is available. However, the databases must be developed to incorporate the procedures for the simplified acquisition procedures and linked to mandatory Government sources. In Redesign Alternative Process III, the analysis also shows the technology to implement the redesigned process is not currently available. However, once developed, it can significantly streamline and automate the process. Chapter 5 discusses the recommended course of action from the

analyses of these processes and provides further areas of recommended study.

V. CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

A. CONCLUSIONS

As discussed in Chapter I, the purpose of this thesis is to address problems and limitations in the current credit card program and to explore methods of improvement using a process innovation approach. Exploring this purpose, through literary research and personal interviews with contracting professionals and individuals at the DoD Purchase Card Program Office, reveals the unique aspects of the DoD Purchase Card. Documenting the process flow prior to the implementation of the commercial credit card, and changes to the process after implementation of the program, provides an understanding of the process currently in use today. Using KOPeR to analyze the current credit card process provides the framework for the development of three redesigned alternatives discussed in Chapter III. The positive implications and potential inhibitors for each alternative are then presented in Chapter IV.

The underlying premise that the DoD purchase card was founded on is to streamline the process by reducing the intensive labor required in the baseline process and eliminating the numerous levels of approval required to execute a purchase. The implementation of the DoD credit

card streamlines this inefficient process and saves the customer from suffering long waiting periods between the time of requisition and fulfillment. Early studies of the credit card conclude that the average transaction cost drops to $17 per transaction and forecast savings of $29.5 million. However, Chapter III analyzes the current credit card process and shows that the process can be further streamlined to reach higher levels of efficiency. Hence, three alternative redesigns are developed and measured against the baseline process using the same methodology.

From the KOPeR analyses of the current credit card process, we find that the process is in need of innovation. Hence, three alternative redesign processes are developed on a continuum dependent on the level of IT development. The first incorporates the use of workflow systems and introduces IT into the process. The significant benefit of this alternative is that it can be implemented now, since DoD already possesses the infrastructure for both databases and e-mail. The potential inhibitors for this alternative are training and maintenance, found only to have a minimal impact on the process.

The second redesign alternative adjusts the availability of information within the process, providing information access earlier in the process. In Redesign

Alternative Process II, the analysis shows the technology to implement the redesigned process is available. However, the databases must be developed to incorporate the procedures for the simplified acquisition procedures and links to mandatory Government sources. This alternative requires the development of advanced databases providing the user access to NSN availability in an easy to use format.

The third redesign alternative incorporates the use of a web-based portal, empowering the user to execute the entire requisition using an expert system. This alternative requires extensive development of a web-based portal system as well as the expert system that incorporates the simplified acquisition procedures. Similarly, analysis of this redesign alternative also shows that the technology to implement the redesigned process is not currently available. However, once developed, it can significantly streamline and automate the process. The only other significant inhibitors to implementation of this process are the maintenance of databases and linkages on the portal to ensure they are current.

The evaluation of the alternative redesign models presented is overwhelmingly positive. The culmination of literary research and process analysis supports the idea

that the current credit card process can be made more efficient and effective by utilizing the enablers discussed in each of the alternative redesign processes. As stated by Davenport, innovation implies a radical change over a long period of time. He describes the innovation process as one producing dramatic results that effects a radical change in the process.

Although each of the redesign alternatives from above offers good potential for process improvement, Redesign Alternative Process III most clearly reflects Davenport's line of thinking by streamlining the credit card process and making it more efficient. Redesign Alternative Process III also focuses on empowerment of the user by providing him with a credit card and the tools (e.g., the web-based portal and expert system) to purchase the required supplies or services quickly and efficiently. This redesign alternative also focuses on automation of the process, eliminating the need for coordination between agents and organizations, which further reduces the friction present in the current process. Finally, Redesign Alternative Process III focuses on the use of a case manager concept, where the user controls all tasks in the purchasing process from requirements generation to receipt of the supplies or services to further streamline the process. Thus, Redesign

Alternative Process III is truly an innovative solution to the DoD Purchase Card Process.

B. RECOMMENDATIONS

Based on the conclusions of this research, the following recommendations are made.

1. **The DoD Purchase Card Program Office should first modify the current purchase card process by implementing the Redesign Alternative Process I.** Because Redesign Alternative Process III requires the extensive development of the web-based portal and expert system to support the process, the DoD Purchase Card Program Office should implement Redesign Alternative I until the additional technology is developed. By implementing Redesign Alternative I, which focuses on the introduction of IT formally in the process, agents can communicate using e-mail and databases, streamlining the process and eliminating tasks which are non-value added.

2. **The DoD Purchase Card Program Office should strive to implement the additional changes identified in Redesign Alternative Process III.** Once the technology is developed to implement the web-based portal, the DoD Purchase Card Program Office should implement Redesign Alternative Process III. This process not only focuses on the use of the web-based portal and expert system as enablers to

streamlining the credit card process, it adjusts the process by having the supplies or services shipped directly to the user instead of an interim location to be received and then forwarded. Thus, additional non-value added steps are eliminated, further streamlining the process.

3. **The DoD Purchase Card Program Office should not consider Redesign Alternative Process II for implementation.** The strength of Redesign Alternative Process I is that implementing the process can be done with today's technology resulting in an increase in process efficiency. Redesign Alternative Process III's strength is that it streamlines the process using a web-based portal and expert system. Redesign Alternative Process II does not, however, significantly add value to the process after taking into account the cost and time required to develop the databases. Thus, the value of this alternative redesign process is not its ability to streamline the credit card process, but proving the concept that providing information to the user earlier, has the potential to add value to the process.

C. AREAS OF POTENTIAL FUTURE RESEARCH

During this study, the researcher found several areas warranting further research. Each area is presented below in a question form followed by a short discussion.

1. ***Can the payment portion of the credit card process be further streamlined using a process innovation approach?*** This thesis stops evaluating the credit card process once the APC forwards the credit card invoice to DFAS. The question that must be answered for a complete evaluation of the acquisition cycle is, what are the processes used by DFAS to process an invoice, and can a process innovation approach be used to streamline the process by focusing on enablers?

2. ***Can the process of using a credit card as a payment vehicle for purchases above the micropurchase level be streamlined using a process innovation approach?*** This thesis focuses on the credit card process below the micropurchase level. The process of using a credit card as a payment vehicle could be looked at to streamline other processes as well. It may be possible to have all contracts below the simplified acquisition threshold paid using the DoD Purchase Card.

3. ***Can Redesign Alternative Process III be used in its current form in the commercial sector?*** In conversations with the commercial sector, the question was posed to this author to determine if Redesign Alternative Process III could be used to streamline the use of credit cards in businesses outside of DoD.

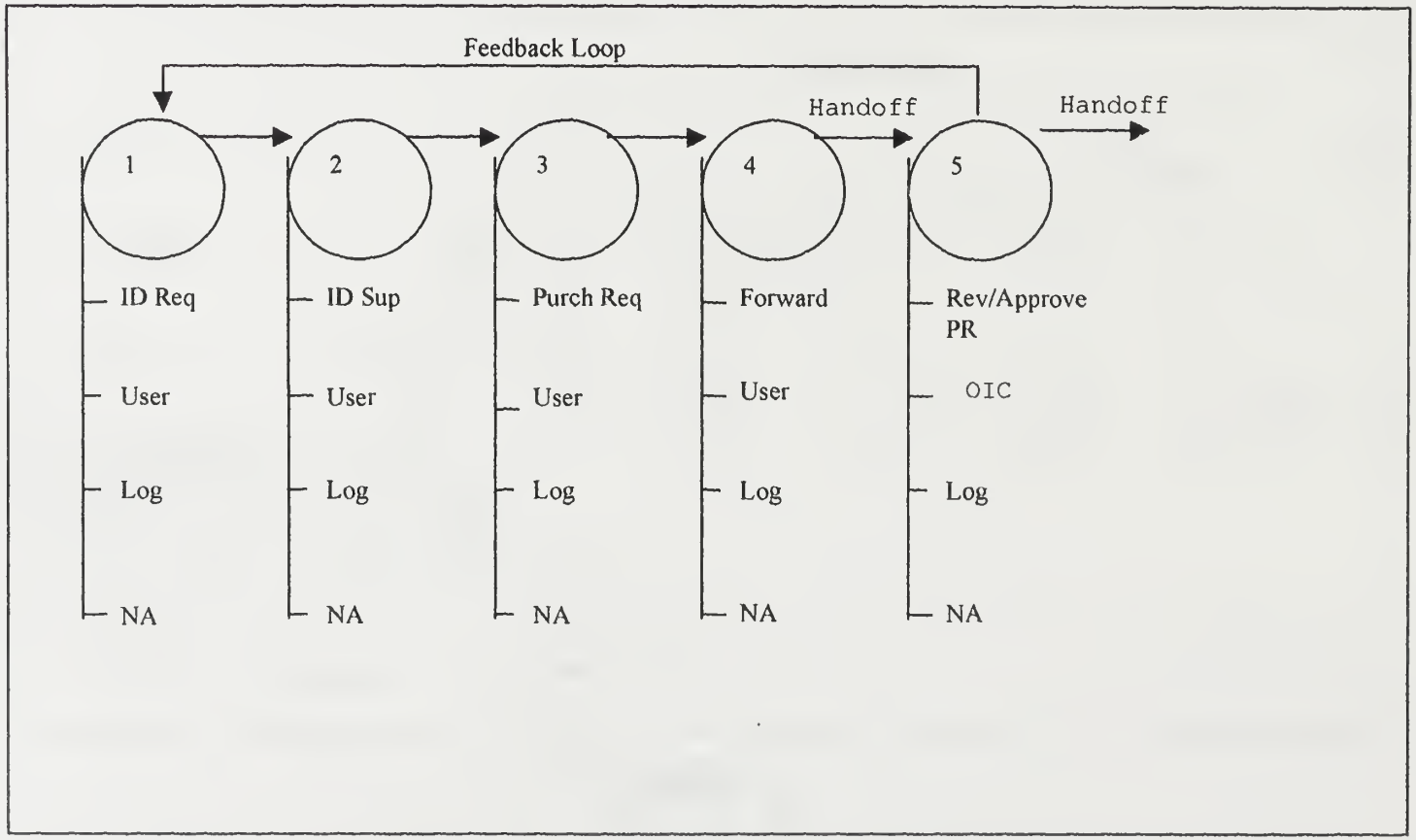
4. ***How can the use of smartcards be used to further the streamlining of the credit card process?*** CitiBank and other credit card companies are developing the technology to use smartcards for both Government and commercial use. The smartcards allow for the warehousing of usage statistics, among other improvements, for the credit card. The question that could be asked is, what are the benefits of moving to smartcard technology for DoD, and can those technology advancements make the process more efficient?

5. ***What are the implications of raising the micropurchase level to the proposed level of $10,000 on the credit card process?*** Currently, DoD is considering increasing the micropurchase level to $10,000. The question that could be asked is, what are the implications of raising this threshold on the credit card process and Redesign Alternative Process III? Additionally, are there other enablers, not considered in this thesis, that could limit the potential inhibitors of raising the threshold to $10,000?

Requirements Generation

Stage 1

IT Supported
IT Communication
IT Automated



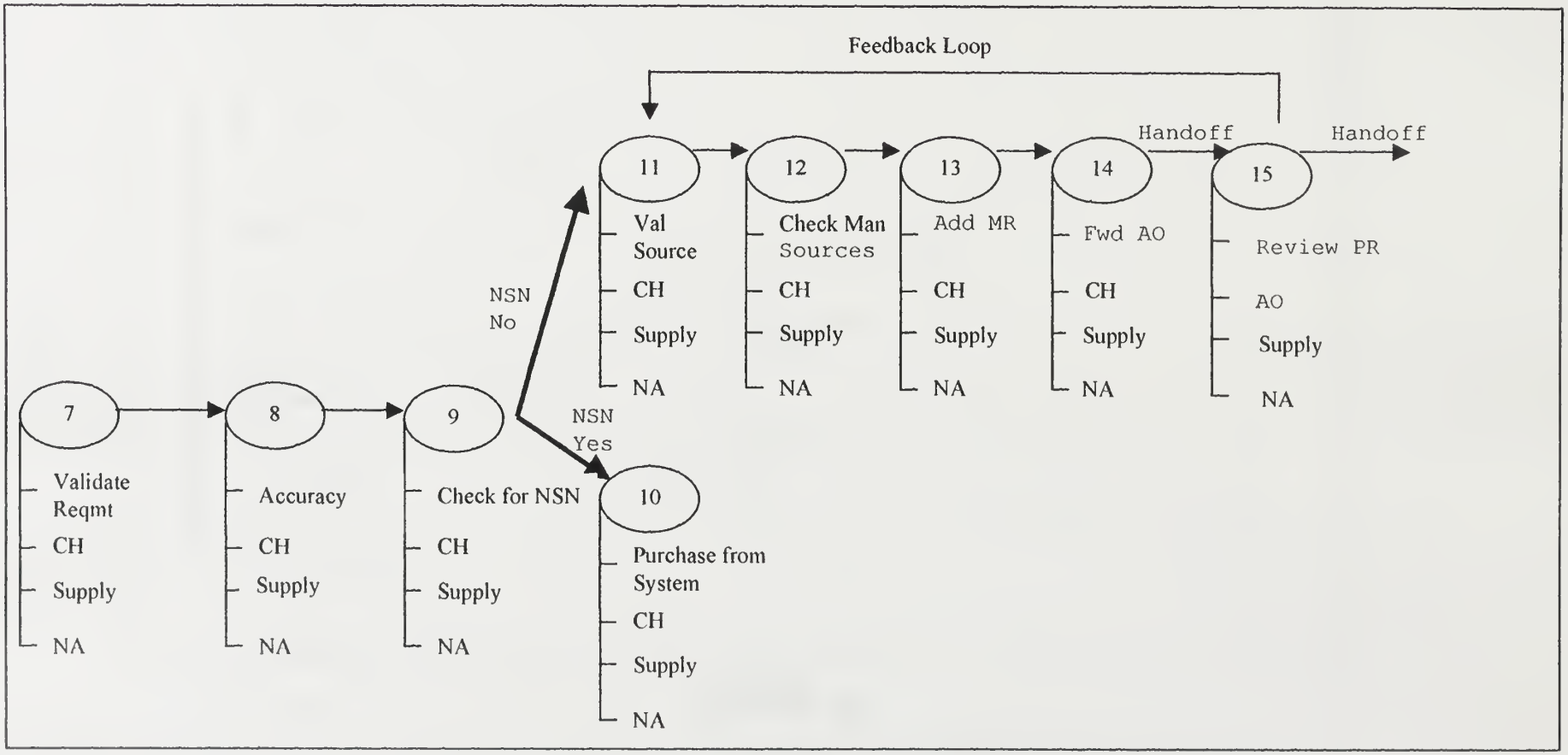
Reservation of Funds

Stage 2

Current DoD Credit Card Process

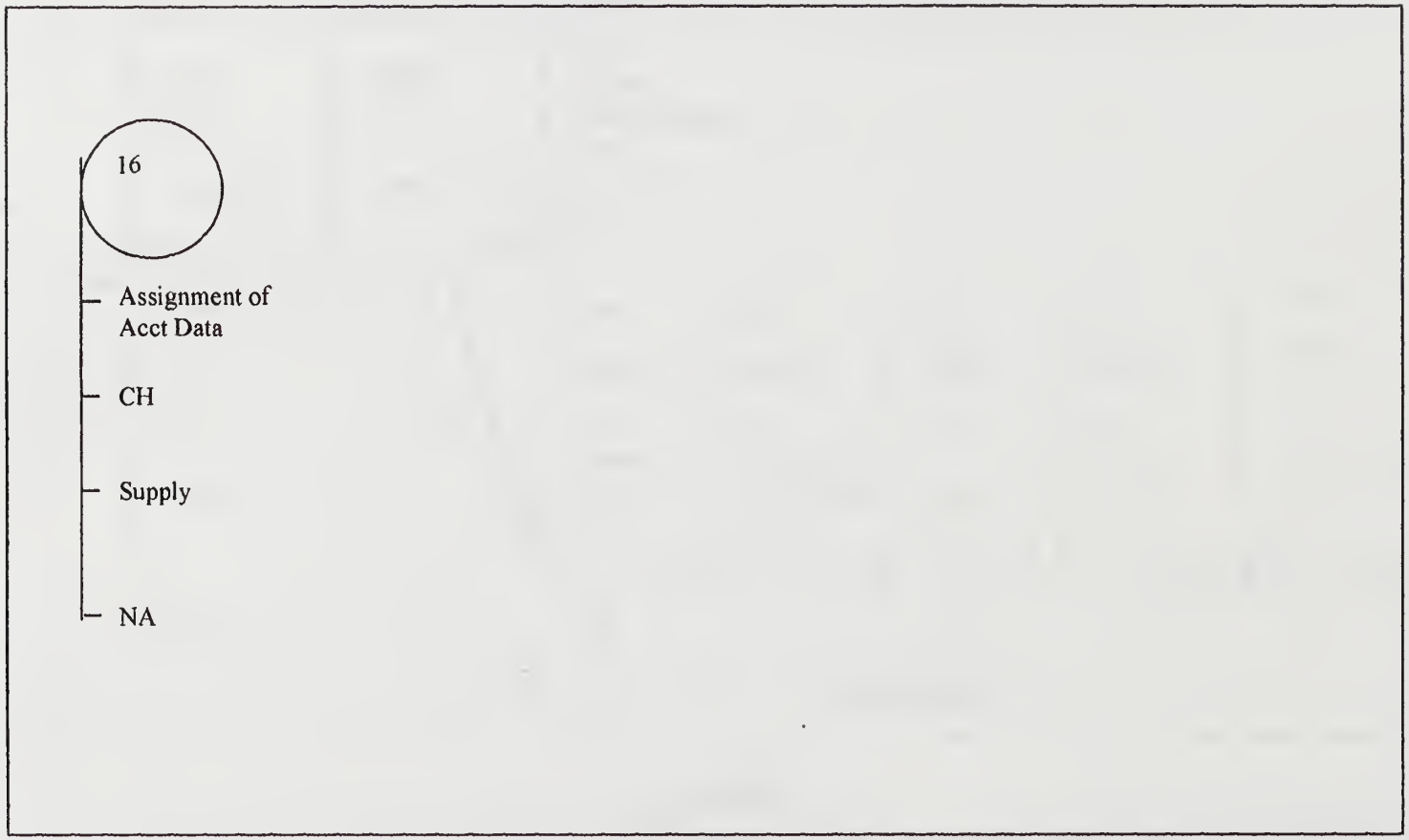
Review of Purchase Request

Stage 3



Assignment of Acct Data

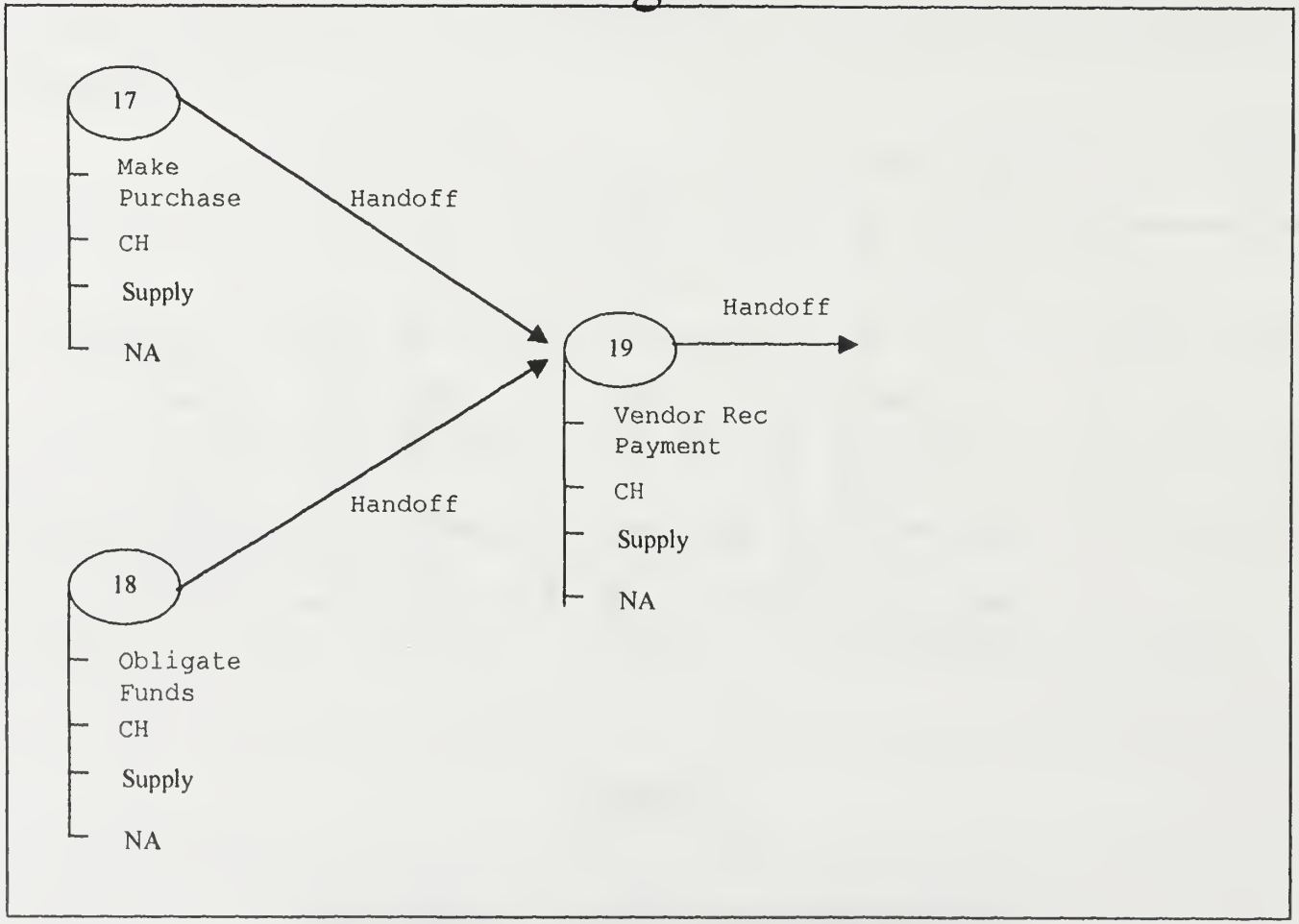
Stage 4



Current DoD Credit Card Process

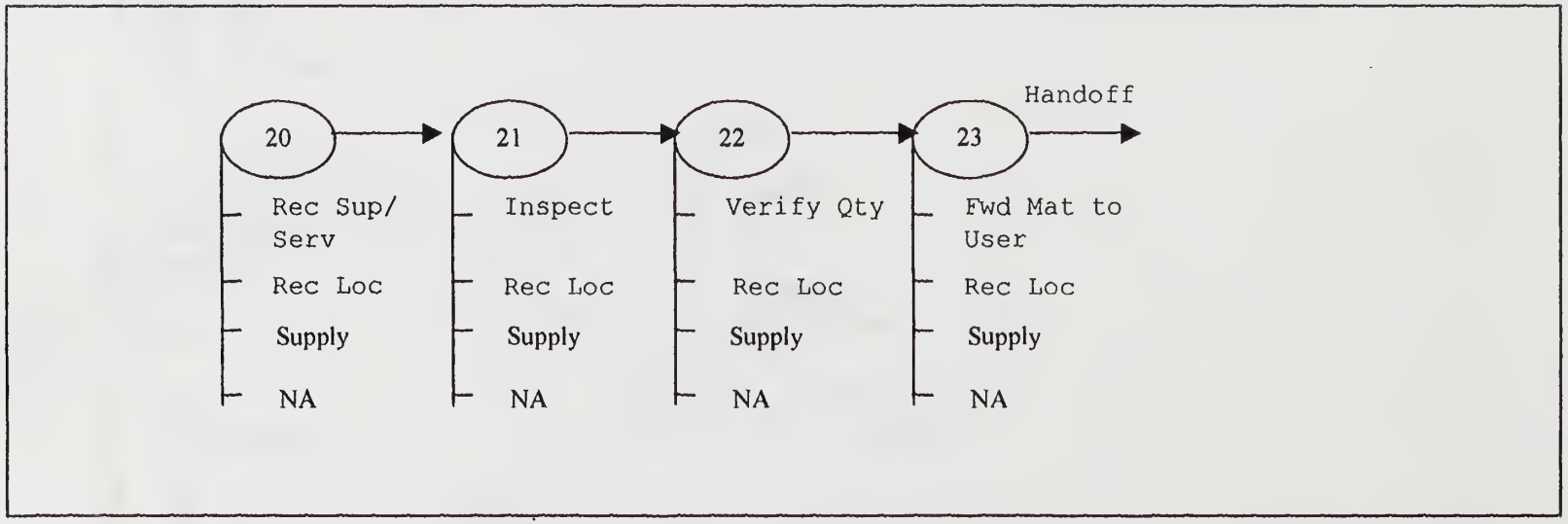
Obligation of Funds

Stage 5



Receipt of Supplies/Services

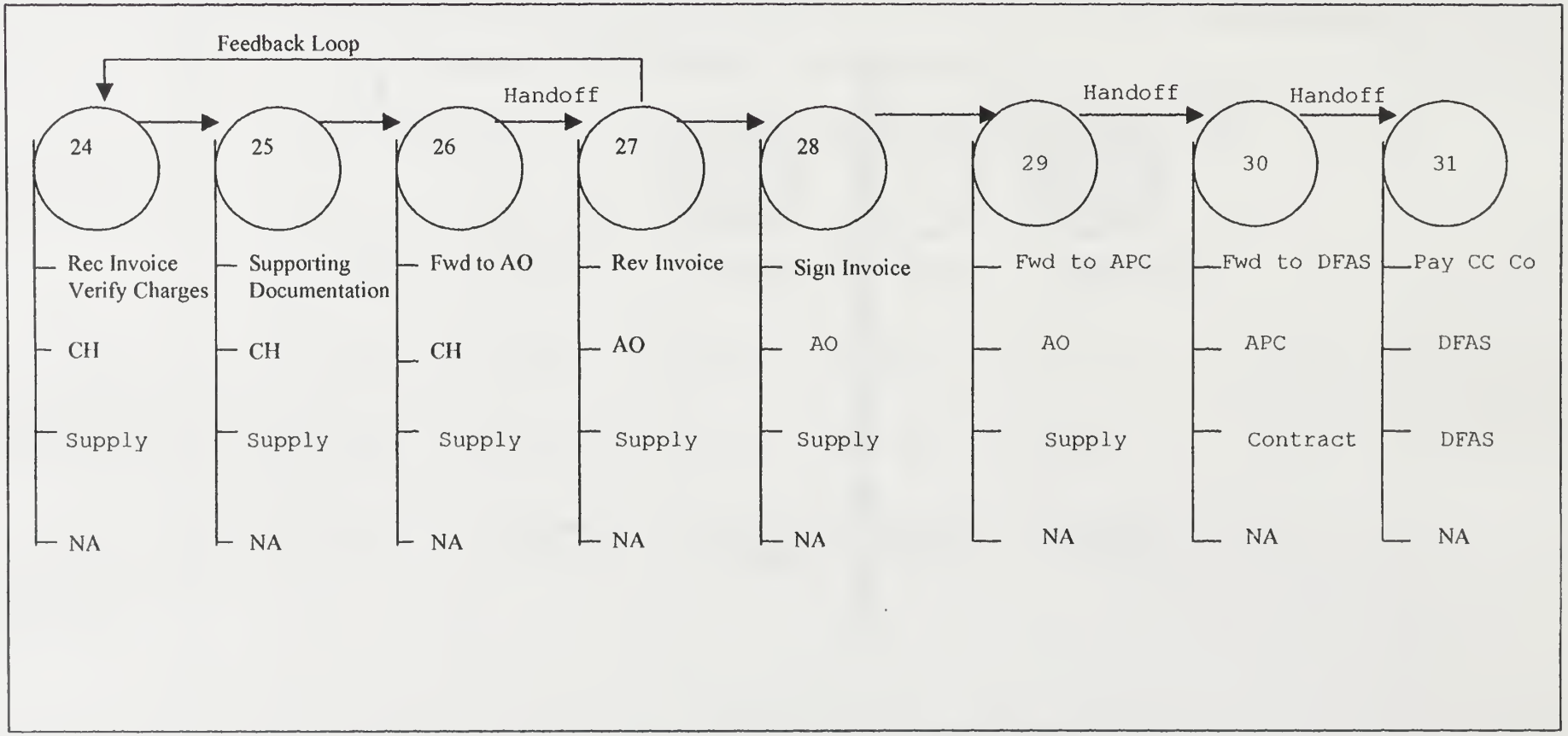
Stage 7



Current DoD Credit Card Process

Reconciliation of Statements

Stage 8



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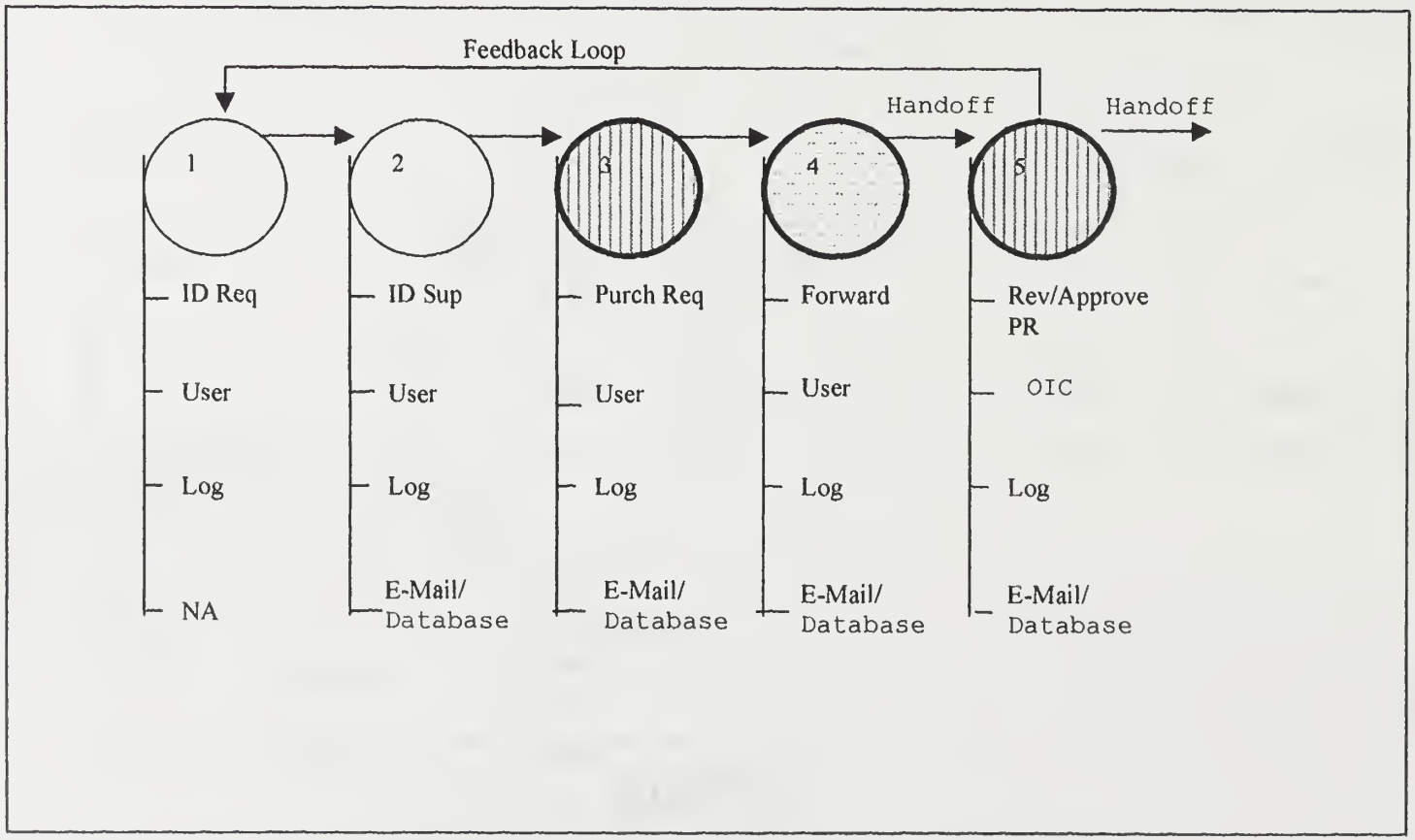
Appendix B: Alternative Redesign Process I

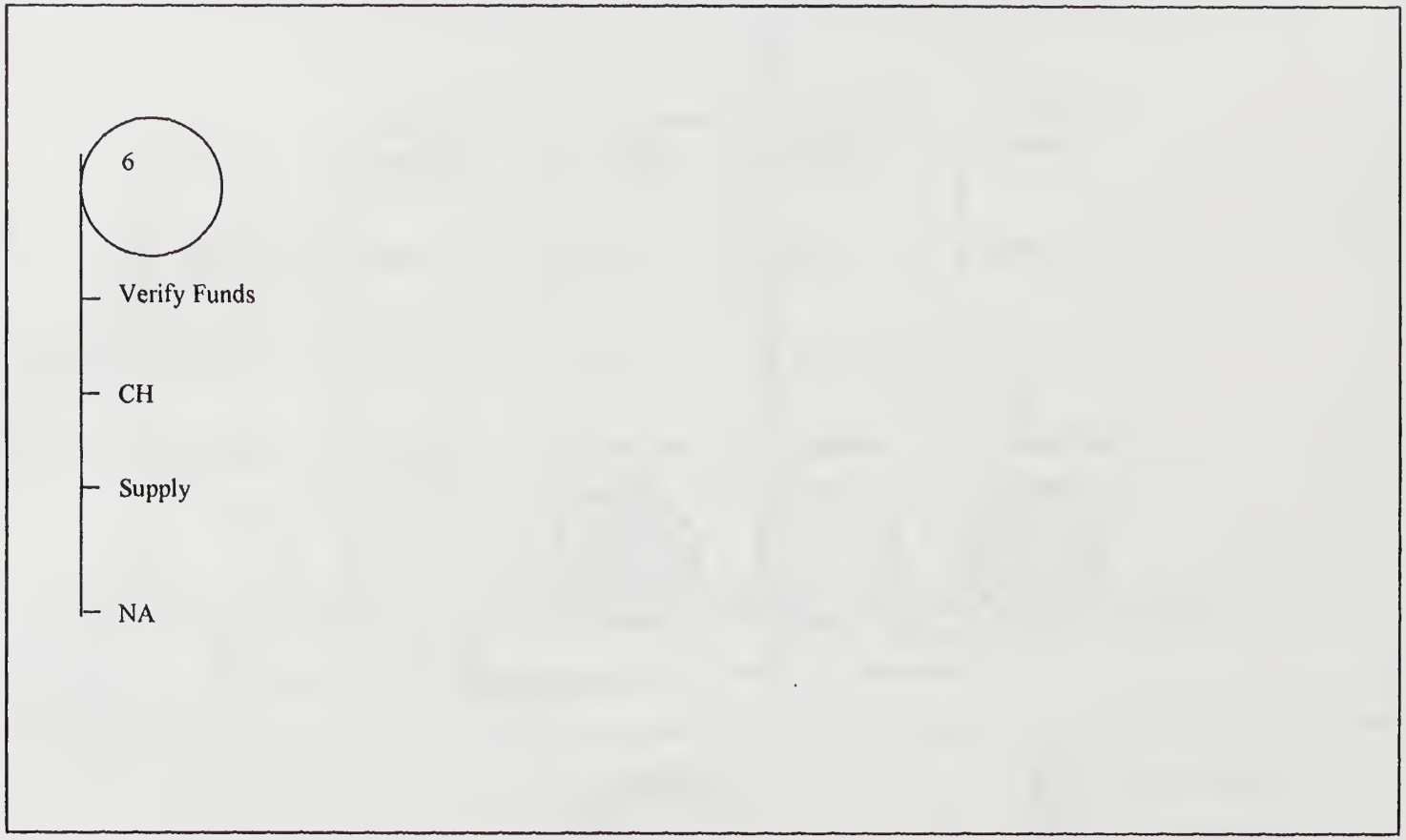
Requirements Generation

Stage 1



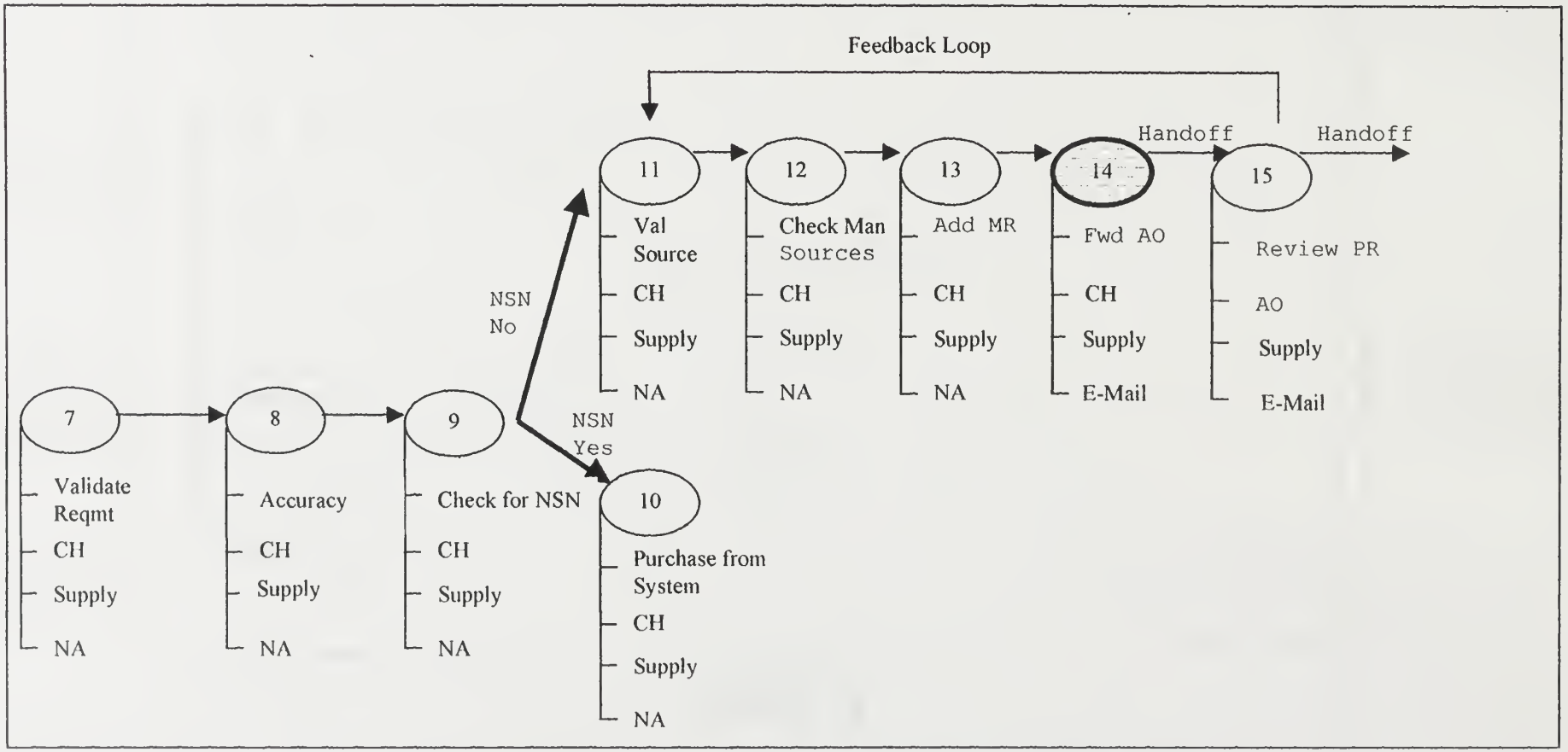
Reservation of Funds

Stage 2



Review of Purchase Request

Stage 3



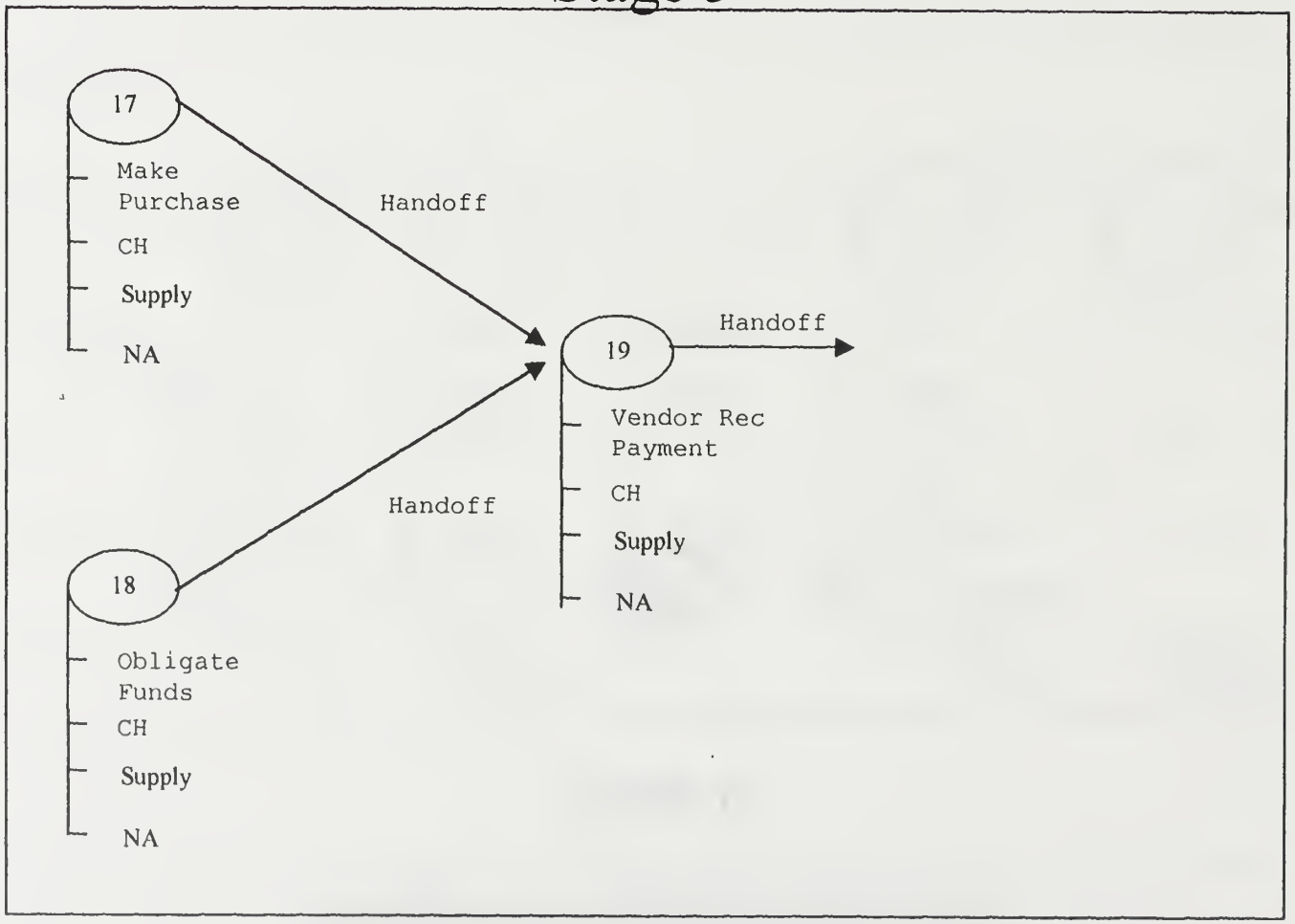
Assignment of Acct Data

Stage 4

Alternative Redesign Process I

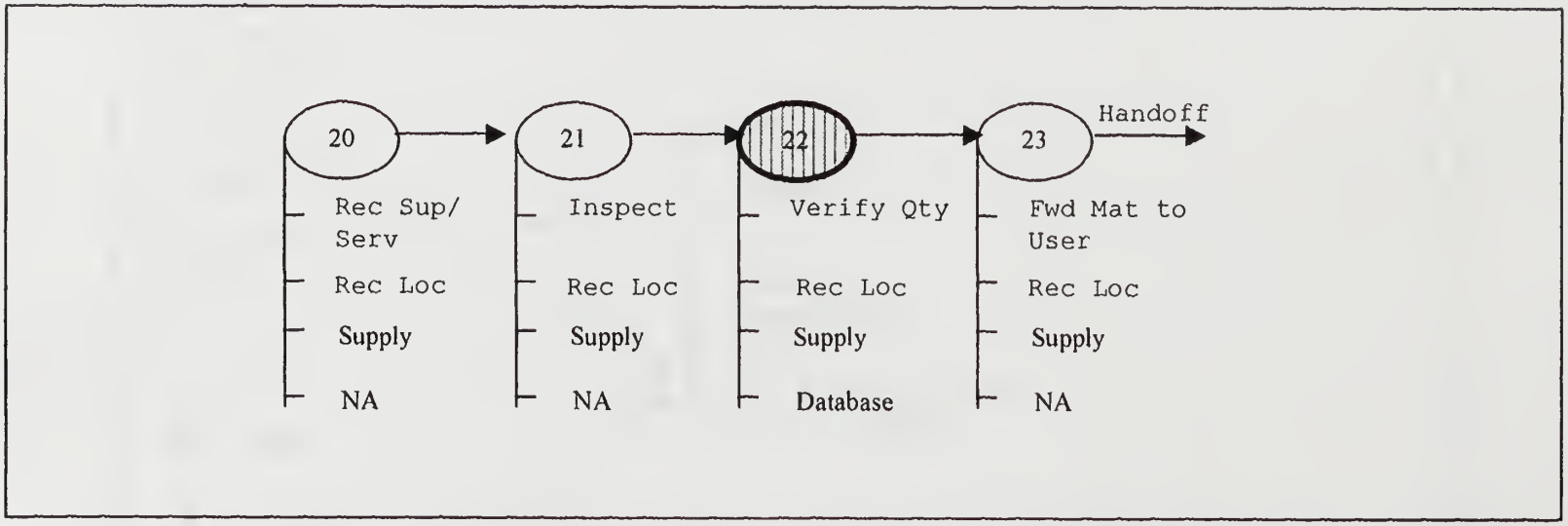
Obligation of Funds

Stage 5



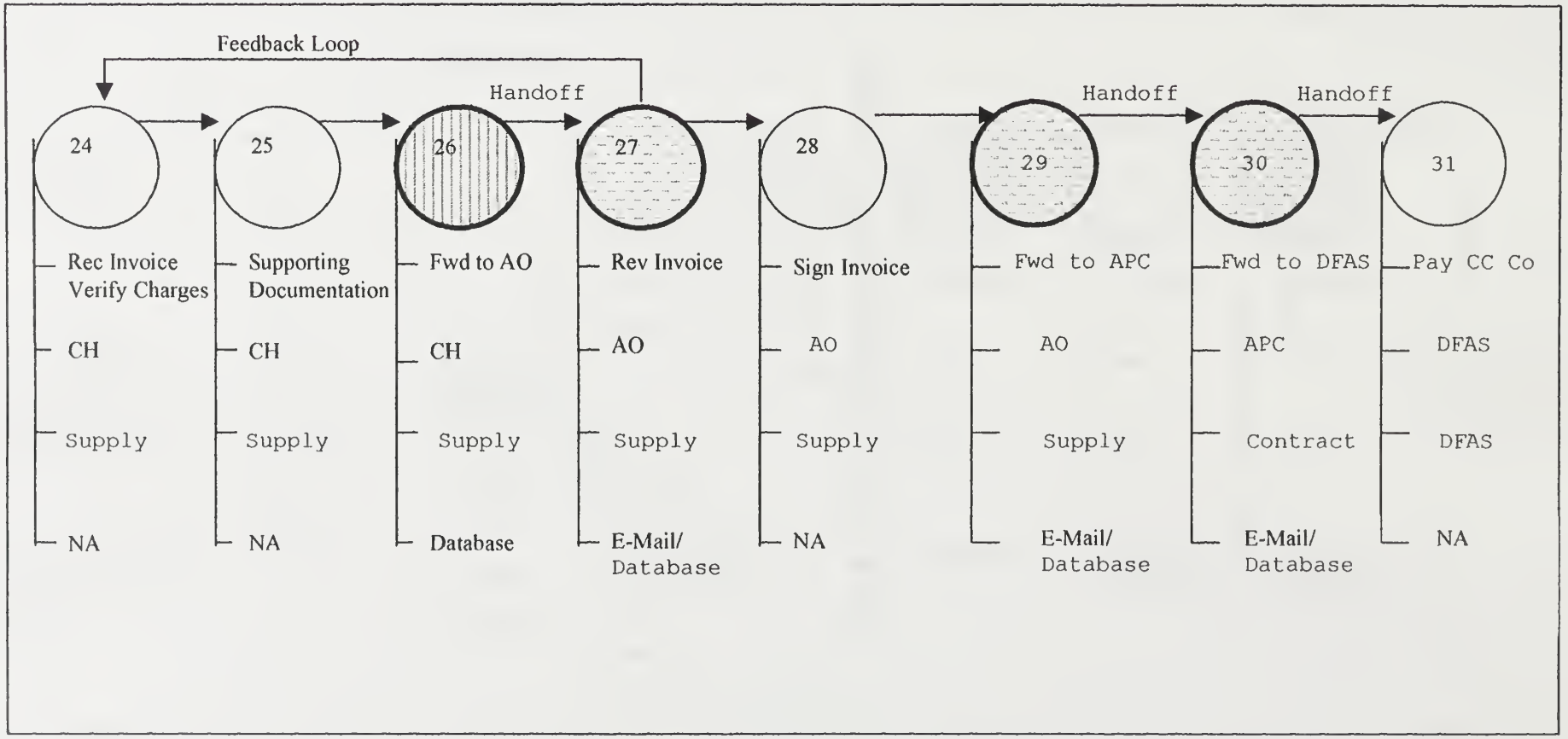
Receipt of Supplies/Services

Stage 6



Reconciliation of Statements

Stage 7



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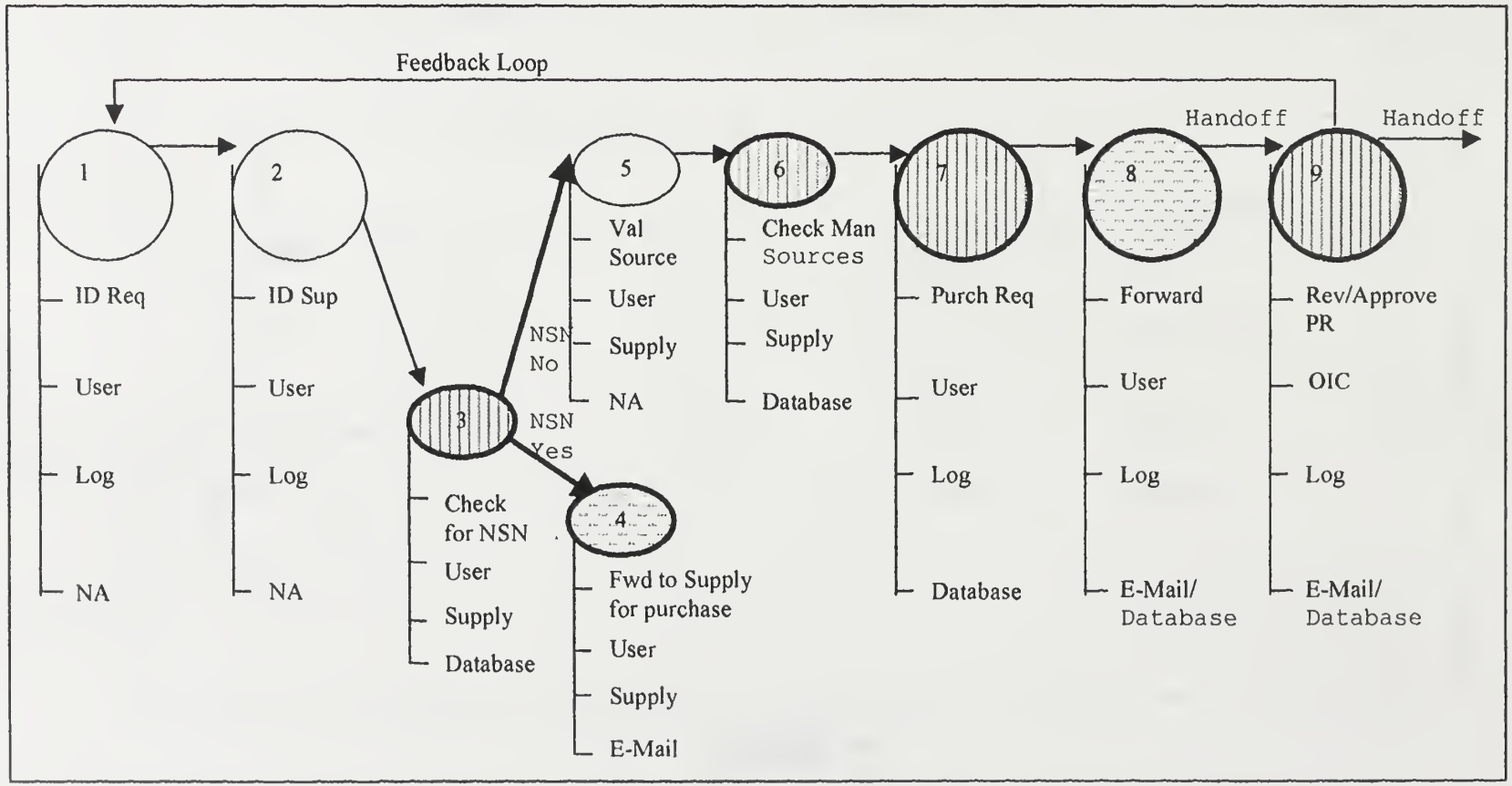
Requirements Generation

Stage 1

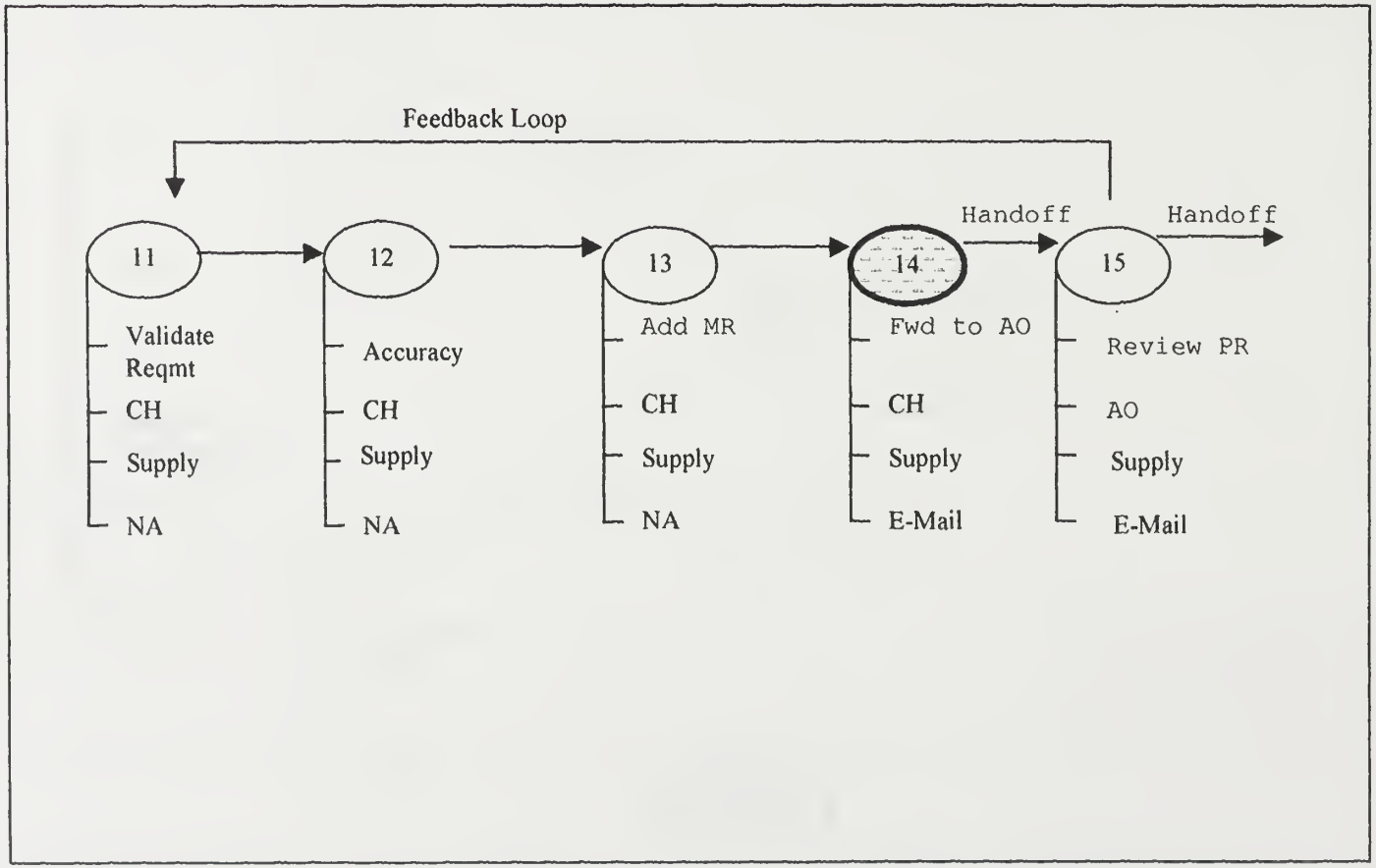


Reservation of Funds

Stage 2

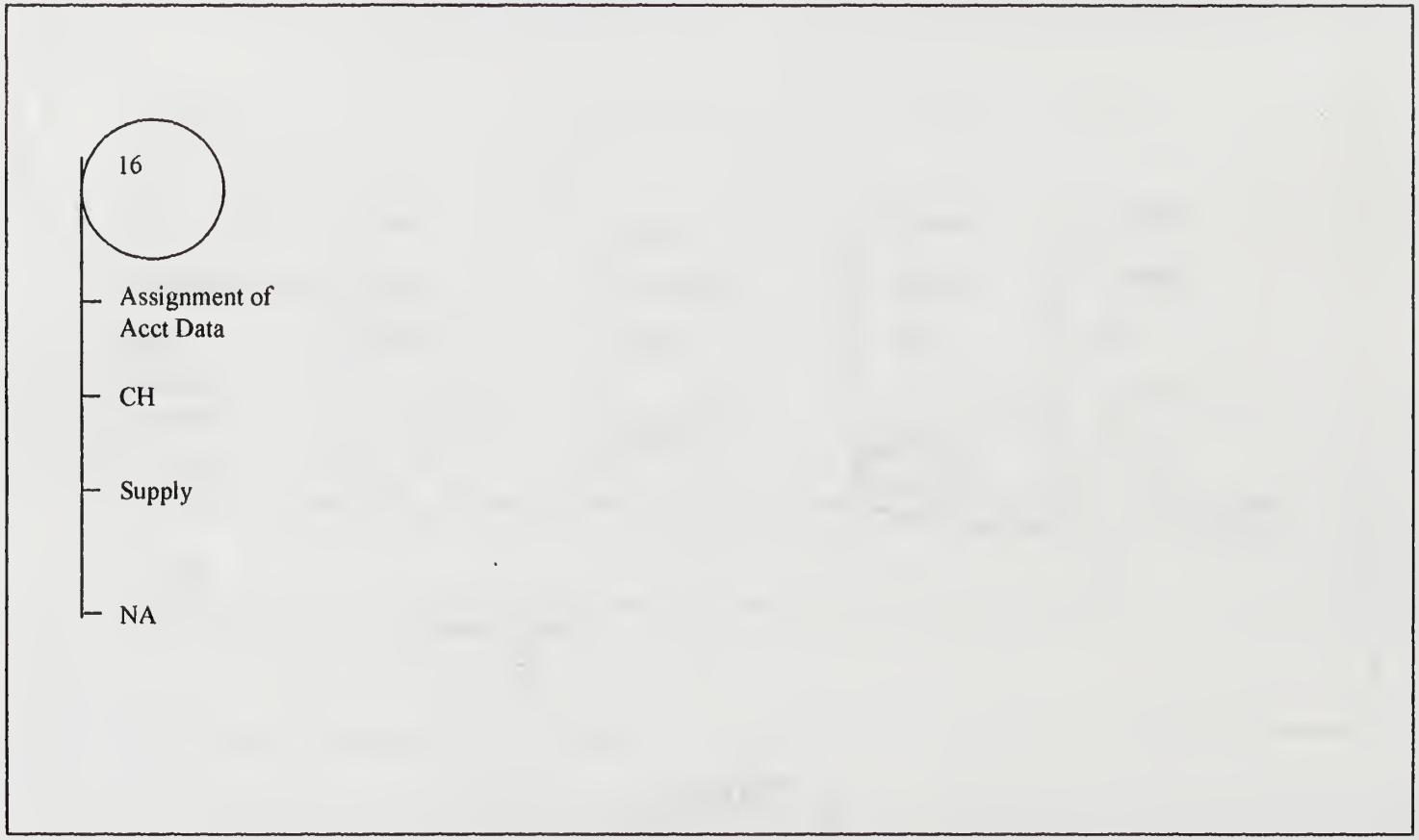
Review of Purchase Request

Stage 3



Assignment of Acct Data

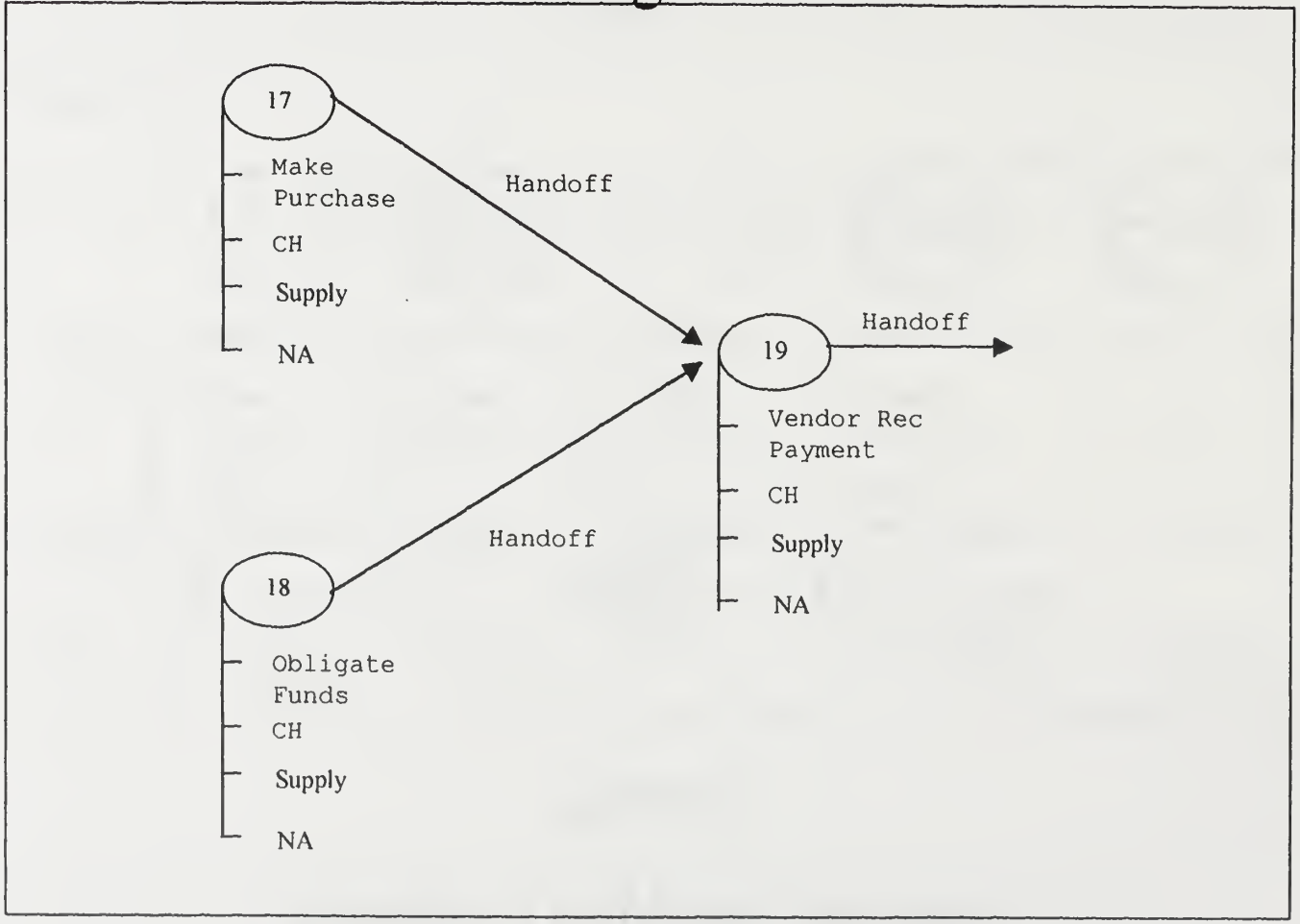
Stage 4



Alternative Redesign Process II

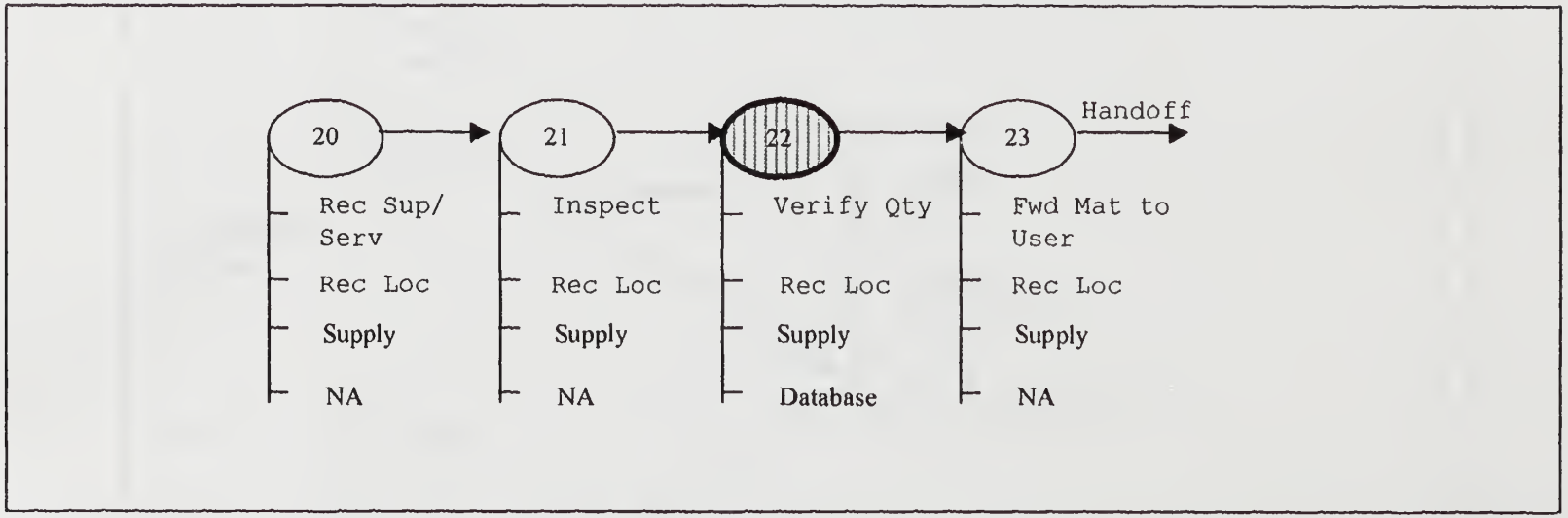
Obligation of Funds

Stage 5



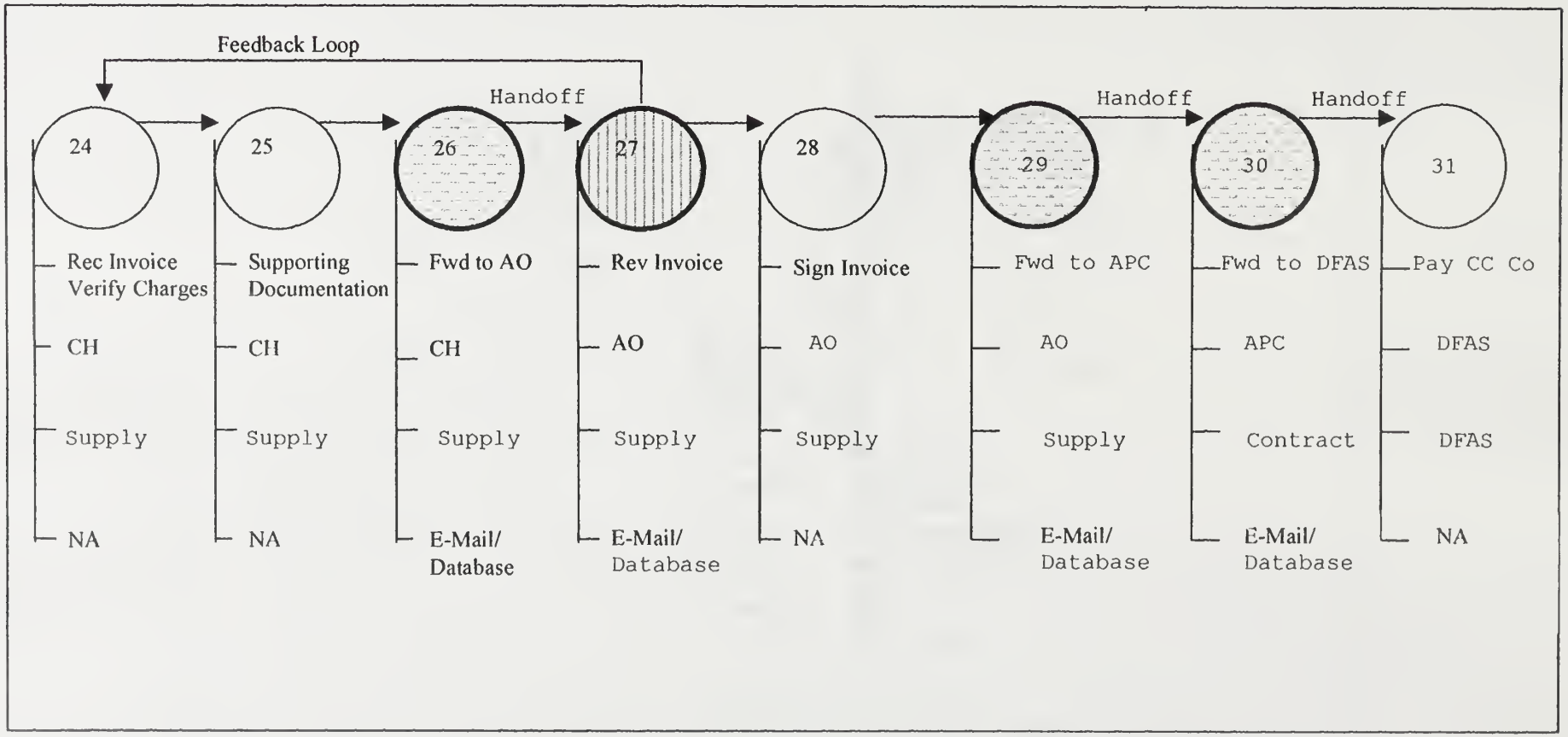
Receipt of Supplies/Services

Stage 6



Reconciliation of Statements

Stage 7



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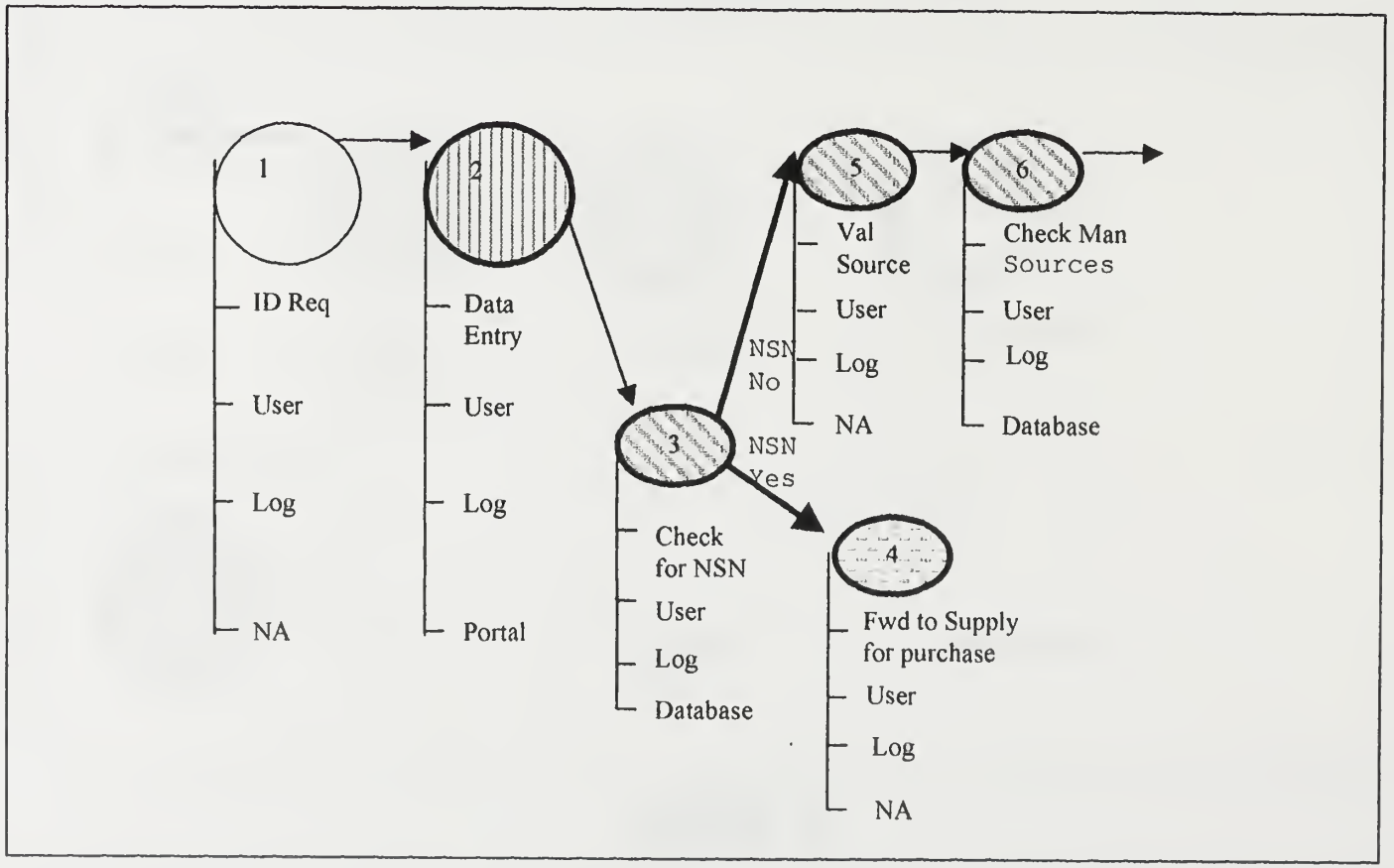
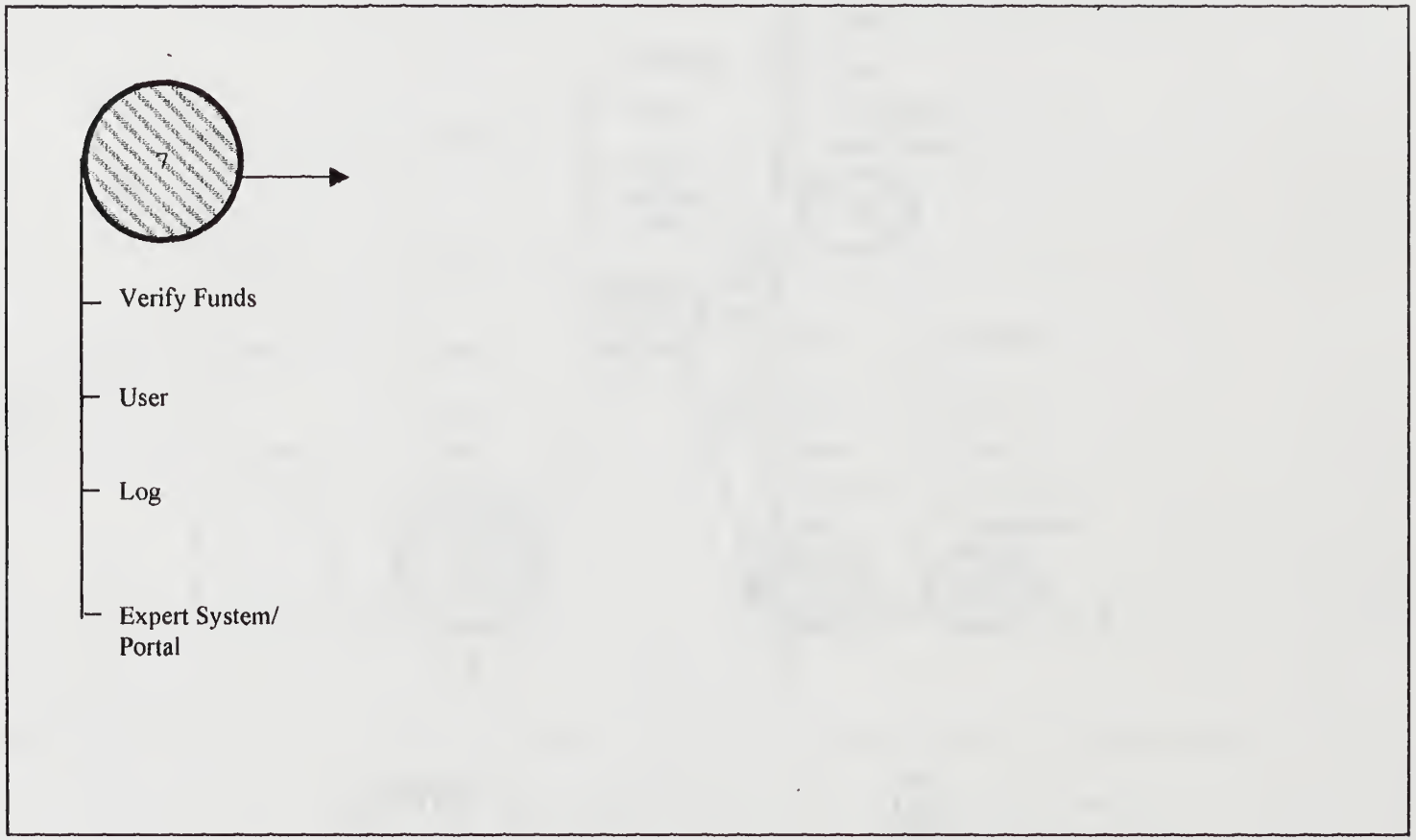
Requirements Generation

Stage 1



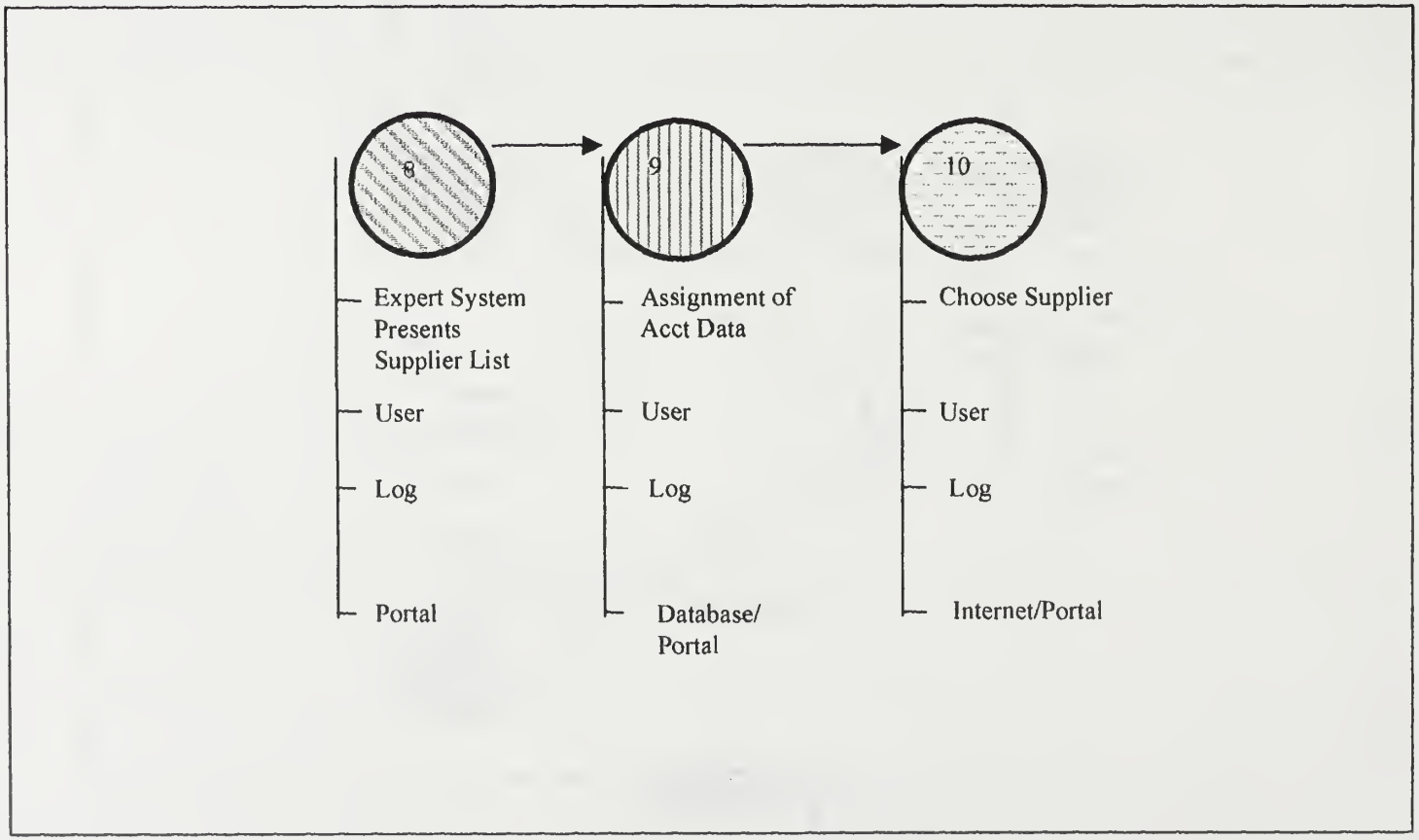
Reservation of Funds

Stage 2



Assignment of Acct Data

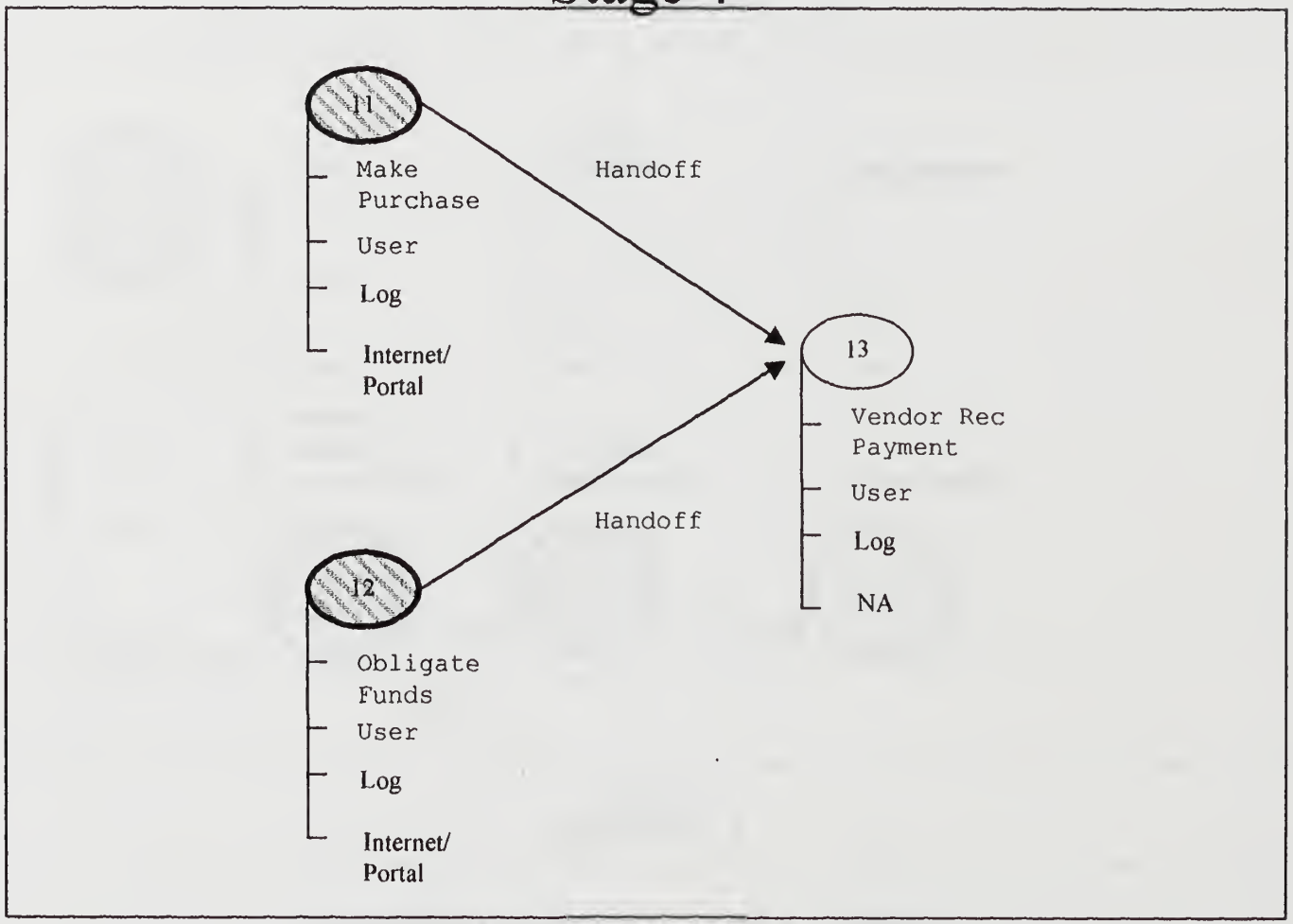
Stage 3



Alternative Redesign Process III

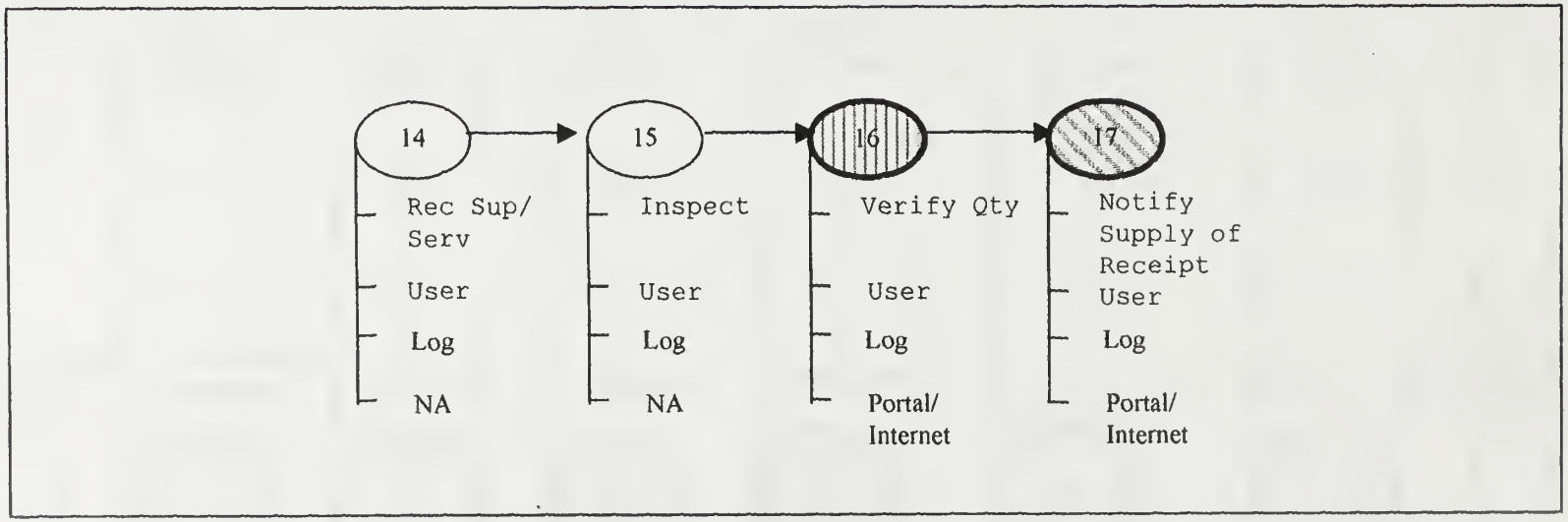
Obligation of Funds

Stage 4



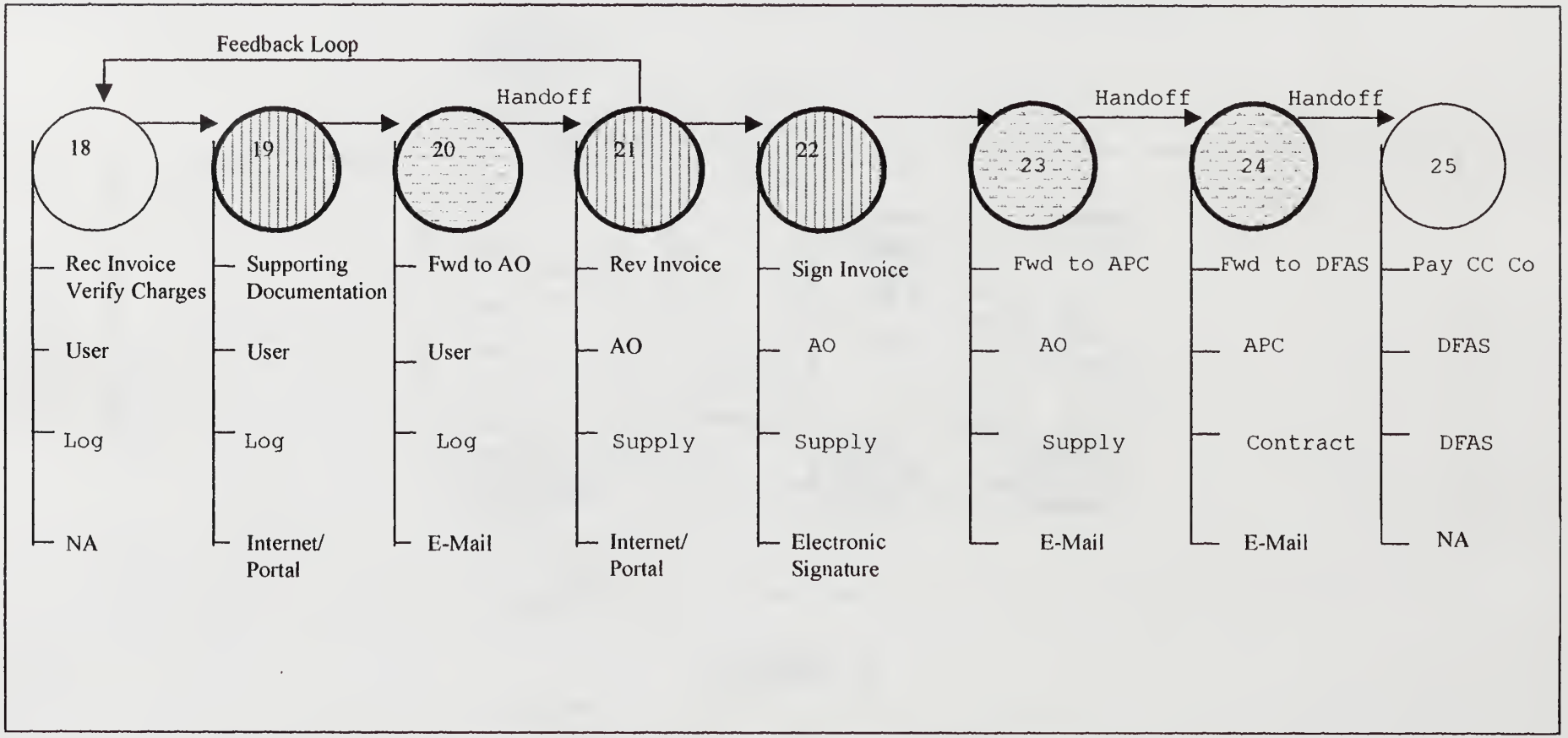
Receipt of Supplies/Services

Stage 5



Reconciliation of Statements

Stage 6



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